

REMARKS

1. This is Applicant's Response to the Office's communication dated 9/5/02 (cover as Exhibit "A", attached). Applicant thanks Examiner Palabrica for the careful attention to detail accorded to the above-identified application. Applicant is disappointed that when the Applicant informed the Examiner that the cited patents, were missing from the Office's communication, that even though the Examiner supplied them, he decreased the normal time of response from three (3) months upon receipt of the full package to two (2) months. Nonetheless, Applicant has tried to fully comply and hereby responds.

2. Claims 1, 5 through 8, 10 through 14, and 21 through 30 remain in this application. Claims 2, 3, 4, and 9 have been cancelled without prejudice. Several claims have been amended pursuant to the Examiner's comments regarding 35 USC 112, second paragraph. Claims 21 through 30 have been added, as the matter was discussed explicitly in the original specification and claims, of which this application is the Continuation. There is no new matter or new material. The language is exactly that of the original specification and claims. There is no additional cost or fees since there are three independent claims and 20 total claims.

3. Applicant notes that Examiner Palabrica has said,
"Applicant elected with traverse species L (palladium for the material). The traversal is on the ground(s) that the species election requirement for the material is indefinite and may not be proper. This is not found persuasive ... The requirement is still deemed proper and is therefore made FINAL."

Examiner Palabrica has not acknowledged that the Office has previously separated this Invention, as defined by Examiner Wasil, into several inventions. The identical original specification and drawings of Serial no. 07/760,970 have already gone through a restriction by the Primary Examiner Daniel Wasil on June 8, 1992. Mr. Wasil separated 07/760,970 into five inventions based upon accuracy and his wisdom and therefore Applicant notes that there is no abandonment of any of the other inventions. Notwithstanding the above, because the Examiner holds the requirement FINAL, Applicant admits on the record that as regards the materials which are loadable by hydrogen and its isotopes as an isotopic fuel, they are not patentably distinct with respect to this application and are obvious variants of each other. All rights are, and remain, reserved.

4. Applicant acknowledges, but respectfully disputes:

Claims 1-14 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Westfall (US 5,215,631).

Claims 1, 2, 10 and 11 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Kinsella (U.S. 3,682, 806).

Claims 1-7, 10-12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Cedzynska et al. (WO 93/01601) or Edwards (WO 90/15416) in view of Westfall.

Claims 8, 9 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Cedzynska et al. in view of Westfall, as applied to claims 1-7, 10-12, and 14 above, and further in view of anyone of Edwards, Sadoway (WO 91/06959) or Van Noorden (NL 8909-962-A) or Dufour (WO 91/01036).

Claims 1-14 are rejected under 35 U.S.C. 101 and 35 U.S.C. 112 by the Examiner, based upon flawed reference to other art ("FP" or "F+P").

Several claims have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

5. The Office's Communication dated 9/5/02 is inconsistent with the Office's previous actions (*infra*) or those of the Federal Court. The Office's Communication dated 9/5/02 does not comply with several of the Office's rules. The Office's Communication dated 9/5/02 contains misstatements that are hereby corrected for the record.

Pursuant to In re Oetiker, Applicant hereby does respond in full to each of the Examiner's points with discussion in detail, below.

Pursuant to In re Morris, Applicant does respond with information including those skilled-in-the-art.

Pursuant to In re Grey, Applicant presents other evidence including those of operability and utility, including in said Declarations [thereby also consistent with *In re Porter*].

where?

6. Supportive information is discussed in attached Declarations, and as discussed below, in references including those made in the "Declaration of Dr. Mitchell R. Swartz" (called "Swartz declaration"), the applicant herein. Also submitted, precisely relevant to this application, through that application from which this application is a Divisional, are the Declaration of Straus (4/22/94), and the Amicus Curiae Briefs of Drs. Edmund Storms (2/21/01), Talbot Chubb (2/22/01), Eugene Mallove (3/24/00) and Hal Fox (2/21/01). In the Swartz declaration, and in previous correspondence with the Office, the Declarant is shown to be qualified as an expert with respect to the subject matter of this application. In the other declarations, and in previous correspondence with the Office, the Declarants are shown to be qualified as an expert with respect to the subject matter of this application.

7. Applicant acknowledges receipt from the Examiner of 12 patents [A, through G, five foreign] and 22 additional references [undistinguished as U through X]. The Office's references will be discussed in detail below. Briefly, the Office's references include very old inaccurate papers, including the usual newspapers, and are nearly all from 1989. They are simply outdated, and at variance with knowledge at the time the present application was filed.

In response to the Office communication and the continued unfairness whereby the Office ignores over 300 publications which the Applicant has sent the Office, the Applicant therefore includes additional references consisting of articles taken from peer-reviewed journals. These references are only necessary to rebut the statements made by the Examiner [pursuant In re Grey, In re Oetiker], and are listed upon the accompanying Forms PTO-1440. They were not relevant until the Examiner made statements which are incorrect, and corrected herein by said art. Almost all precede the present application and show that the concepts objected to by the Office have been accepted in the scientific community through peer review publication at the time the patent was filed. Furthermore, because there has been a significant rebuttal to the the 35 USC 112 and 101 issues, the Applicant includes two responses from which the present application is a divisional. Said responses (re: '970, Amendment under Rule 116 (Nov. 2, 1993) and Reply Brief to Examiner's Answer (April 23, 1994), and the Appendix "Introduction to Barriers", demonstrate that this materials was sufficient for the previous Examiner, D. Wasil, and almost all of the issues were resolved.

where?

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8. The Examiner states,

"This application does not contain an abstract of the disclosure, contrary to the requirement of 37 CFR 1.72(b). An abstract on a separate sheet is required."

The TRUTH - An Abstract was Submitted and Received

An Abstract was submitted and received as is confirmed by the stamp of the Office [Exhibit "B"].

A exact copy is attached hereto which is identical to that which was submitted and received. The applicant thanks the Examiner for the notice that the Abstract was removed by someone at the Office, as has occurred with several portions of Applicant's other patent applications in this field. The Applicant asks the Examiner for a list of who had access to this file folder after the Post Office of the Patent Office received said Abstract.

9. Applicant acknowledges the Notice of Patent Drawing Objection. New drawings will be filed after allowance.

COMMENTS ON THE AMENDMENTS AND REMARKS

10. For the convenience of, and at the request of, the Examiner, the Amendments also appended.

In all cases of amendment, there is no new material added. The changes were only made in response to the comments of the Examiner, the wording and scope of the changes maintains the wording and scope of the original disclosure. The new claims and amendments are strictly composed of the language of the specifications and claims of the original disclosure. In each case, wording and scope of the addition maintains the wording and scope of the original disclosure.

11. Based upon the Examiner's comments the claims of record have been rewritten and amended as Claims 1, 5 through 8, 10 through 14, and 21 through 30 which fully and completely distinguish the invention over the cited references. These claims respectfully are submitted and are patentable over the cited references because:

i) the claims recite novel structure and thus are distinguished physically over every reference [Sec. 102], and

ii) said physical distinction effects new and unexpected results, thereby indicating that said physical distinction is unobvious [Sec. 103].

The invention at issue in this case, '691 and claimed by Claims 1, 5 through 8, 10 through 14, and 21 through 30, is generally speaking a method to produce a product which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

In the preferred embodiment, method has two orthogonal applied electric fields. The second applied electric field intensity is delivered after full charging has been achieved. Separate connections for the applied electric field intensities. The cathode in the preferred configuration is divided into parallel slabs and alternate deuteron-impermeable barriers. Barriers are used to strategically inhibit the flow (Appendix C). In the preferred embodiment, the cathode is axially-loaded with the isotopic fuel. Each of these features has obvious great utility.

not in claim
that recite
"non-parallel"
He is that
necessarily
orthogonal

not in
claim

ON PURPORTED NEW MATTER

12. The Examiner states,

"The applicant has filed the current application as a division of an earlier application, S/N 07/760,970 filed on 9/17/91. However, it does not qualify as such because it contains subject matter that was not disclosed in the earlier application ... to hydrogen storage, fuel cells, nuclear fusion, and other reactions in pressure-loaded metals such as titanium or palladium filled with deuterium and to the broader field of metallurgy and engineering in or about metals, including Group IVb, Vb and some rare earths".

THE TRUTH - There is No New matter

The applicant acknowledges the Examiner's statement, and in response hereby removes those portions of the Amendment involving fuel cells and pressure. The remaining portions, involving hydrogen loading (i.e. storage) and nuclear fusion were discussed explicitly in the original specification, and in the application of which this application is the Continuation. Hydrogen loading and nuclear fusion are not new matter or new material, and the Offices and Board's responses prove this convincingly and explicitly. Hydrogen loading is what obviously occurs during loading because of conservation of mass. Furthermore, electrochemistry is obviously used because of the aqueous solutions and applied electric field

original
has "cold
fusion"

intensities, and as is consistent with the literature, including that cited, such as Uhlig, H.H., "Corrosion and Corrosion Control", Wiley (1971), BOCKRIS, O'M, J., K.N. REDDY, "Modern Electrochemistry", Plenum Press (1970), VON HIPPEL, A. "Dielectric Materials and Applications", MIT Press, (1954); and VON HIPPEL, A., D.B. KNOLL, W.B. WESTPHAL, "Transfer Of Protons Through 'Pure' Ice Ih Single Crystals", J. Chem. Phys., 54, 134, (also 145), (1971). So that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

Because hydrogen loading and storage in palladium, and nuclear fusion, and other reactions were discussed in detail in the original specification of the present application. Therefore, pursuant to 35 U.S. 132 this amendment is proper because it does not introduce any new matter into the disclosure of the invention. The Applicant has corrected this pursuant to notification of the Examiner.

The Applicant disputes the addition of new matter and is willing to go back to the Federal Appellate Court in 00-1108 with the Examiner to determine exactly what they meant if the Examiner disputes this.

PURPORTED INDEFINITENESS

13. The Examiner states,
"... there is neither an adequate description of what constitutes a "desired reaction" and, where applicable, how does this differ from an "undesired reaction.""

THE TRUTH - DEUTERON IMPENETRABLE BARRIERS REFER TO DIFFERENT APPLICATION

It is disingenuous for the Examiner to claim there is "neither an adequate description of what constitutes a 'desired reaction'" nor how "does this differ from an 'undesired reaction.'" There has never been a problem for the Examiner in this regard, or with the Declarants who are skilled-in-the-art, or even with the court [In re Swartz 00-1107 and In re Swartz 00-1108].

"... (I)ndefiniteness in claim language is of semantic origin" [In re Hammack, 427 F.2d 1384 n.5, 166 USPQ 209 n.5 (CCPA 1970)] and indefiniteness is the opposite of definiteness. Applicant has fully complied with the definiteness requirement of the second paragraph of 35 U.S.C. §112. The original specification and claim adequately presented the claimed invention so that an artisan, or those skilled in the art, could practice it without undue experimentation [In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed.Cir.1988)].

Definiteness is a characteristic of a patent claim in which claim language makes the scope of the claim clear to a person skilled in the art to which the invention pertains [MPEP 2173, MPEP 2173.02, MPEP 2173.05(a)]. Pursuant, to MPEP 2173, Applicant claimed with particularity, and did point out and distinctly claim the invention. Applicant's claims are therefore definite because the claims are precise, clear, correct, and unambiguous to a person skilled-in-the-art and, therefore, there was definiteness because the specification did conclude claims particularly pointing out and distinctly claiming the subject matter.

Furthermore, the Applicant has corrected this pursuant to notification of the Examiner. There is definiteness because, pursuant to 707.07(d) the Examiner pointed out wherein the indefiniteness resided, and now the Applicant submits precise corrections which the Examiner suggested. Each and every one.

DEFINITENESS BECAUSE OF CITED ISSUES ADDRESSED

14. 35 U.S.C. 112, second paragraph requires the Examiner had to provide reasons why the terms in the claims and/or scope of the invention are unclear "in a positive and constructive way, so that minor problems can be identified and easily corrected, and so that the major effort is expended on more substantive issues." All definiteness issues are hereby addressed. If there are other issues with Claims 1, 5 through 8, 10 through 14, and 21 through 30, the Examiner is asked to with specificity and clarity further explain what the rejection is based on [Ex parte Ionescu, 222 USPQ 537, 539 (Bd. App. 1984)].

DEFINITENESS CORROBORATED DECLARATIONS

15. There is definiteness because, supplementing the detailed specification, the Applicant submits further corroboratory expert testimony [Ex parte Gray, 10 USPQ2d 1922, 1928 (Bd. Pat. App. & Inter. 1989)] including Declarations and Amicus Curiae Briefs --which must be reviewed carefully. The Examiner must accurately discuss the invention as it is actually taught in the original specification and claims. The claimed invention should be the focus of the definiteness requirement.

DEFINITENESS SUPPORTED BY THE CLAIMS

16. There is definiteness because the pending claims must be given the broadest reasonable interpretation consistent with the specification [In re Prater, 415 F.2d 1393, 162 USPQ 541 (CCPA 1969), also MPEP Section 2111 - Section 2111.01] and the specification stated the meaning of the terms in the claims [In re Zletz, 893 F.2d 319, 13 USPQ2d 1320 (Fed. Cir. 1989)].

Furthermore, there is definiteness because pursuant to 2173.05(a) the meaning of every term used in the claims was apparent from the prior art, cited art, and from the specification and drawings at the time the application was filed.

There is definiteness because the claims must each be given the broadest reasonable interpretation consistent with that which one who is skilled-in-the-art would reach [In re Morris]. In this case, it is corroborated by both the Declarations, Amicus Briefs, and peer-reviewed publications.

There is definiteness because the preamble of claim 1 recites the purpose of the process, and the process steps are able to stand alone (MPEP 2111.02).

There is definiteness because pursuant to 2173.05(b) the fact that claim language may not have been precise cannot automatically render the claim indefinite under 35 U.S.C. 112, second paragraph [Seattle Box Co., v. Industrial Crating & Packing, Inc., 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984)].

There is definiteness because acceptability of the claim language depends on whether one of ordinary skill-in-the-art would understand what is claimed, and that is confirmed by the light of the specification, the Declarations, the Amicus Briefs, and the peer-reviewed publications [Ex parte Porter, 25 USPQ2d 1144, 1145 (Bd. Pat. App. & Inter. 1992)].

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION - DEFINITENESS SUPPORTED BY PROBATIVE REFERENCE

17. There is definiteness because Applicant provided (and provides again), in addition to the detailed specification, corroboratory probative reference in the form of peer-reviewed publications [e.g. Swartz (1992), Swartz (1994A), Swartz (1994B), Swartz (1997A), Swartz (1997B), Swartz (1998A)] which prove understanding by one skilled in the art [Atmel Corp. v. Information Storage Devices Inc., Fed. Cir., No. 99-1082, 12/28/99].

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION - DEFINITENESS PROVE BY OTHER REJECTIONS

18. Applicant notes to the Examiner that there had to have been definiteness because the Examiner could not have made the rejection under 35 U.S.C. 102 of claims over Westfall, Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour, had the invention truly been without definiteness. The fact that claim 1 was found by the examiner to be anticipated by Westfall, or Wesfall and Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour or the other cited Art, proves that the present invention obviously has definiteness.

The Claims Distinguish Over The References Under 35 U.S.C. 102 (b)

19. Claims 1-14 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Westfall (US 5,215,631). The applicant notes that the application '970 -of which the present invention '691 is a continuation of- was filed 9/17/91 prior to Westfall (June 1st 1993). In addition it precedes the filing date of Westfall (Oct. 11th, 1991). Nonetheless *in arguendo*, for the sake of argument, the applicant will now discuss Westfall in full detail to demonstrate that even if it was timely, which it is not, and if it were relevant to the present novel invention, which it is not.

20. The Office states that Westfall discloses,

"Applicant's claimed method of low temperature electrolytic nuclear reactions is practiced on an apparatus of non-cold fusion art (e.g. Westfall [U.S. 5,215,631] ... is identical to the applicant's, and, these apparatuses are all operated in an identical manner, i.e., the application of orthogonal electric fields."

"Westfall discloses a process for growing crystals by electrodeposition.

He teaches that his invention has use in growing palladium, titanium and other metal crystals for "cold fusion" electrodes (e.g., see column 1, lines 36+, column 2, lines 37+, and column 3, lines 32+). "

THE TRUTH - Different Purposes. Westfall makes growing crystals at 4.2 feet per hour

US 5,215,631 discloses a process and an apparatus for growing large crystals by electrodeposition. Westfall, as discussed therein, grows enlarging metal crystals as shown in figures 2a through 2d, therein. Westfall's invention is to produce dendritic crystals and explicitly involves ribbon crystal and crystalline growth systems with growth rates (deposition rates) of 4.2 feet per hour in linear growth rate (column 36 lines 17 through 22). In Westfall, the crystals grow to become freestanding single crystals of tin in its cubic and tetragonal forms. Westfall uses said grown crystals to make photovoltaic cells, as discussed in column 13, lines 55 through 66.

Westfall's crystals, grown at 4.2 feet per hour, do not have the purpose, advanced technology, features, and advantages of the present invention. Unlike Westfall, '691 teaches a method to produce a product which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said

material, means to control the distribution of the loaded isotopic fuel within material, means including barriers impermeable to the flow of said isotopic fuel within said material. This is clearly shown in the Figures, and discussed, in the original specification of 691.

21. The Office states that Westfall discloses,
"electrolytic apparatus shown in Fig. 1 comprising a bath (4) between a working electrode 8 (where the crystal growth occurs) and a counter electrode (which replenishes the electrolytic solution's concentration of ions of the to-be-deposited material."

THE TRUTH - Different Inventions - Even The Surface of Westfall's Electrode changes in Position

US 5,215,631 discloses a process and an apparatus for growing crystals by electrodeposition. The electrode keeps moving (unlike the present invention) at 4.2 feet per hour (column 36 lines 17 through 22). Westfall --as it claims-- is simply a process and an apparatus for growing crystals in linear growth rate (column 36 lines 17 through 22), useful for freestanding single crystals of tin in its cubic and tetragonal forms. Even the anode used in Westfall is shaped to enhance the rate of growth of the crystal (column 5 lines 43 through 49) using "crucibles ... chosen ... to survive the corrosive nature of the molten salt baths" (column 32 lines 55 through 59). Westfall includes none of the features of the present invention.

By contrast, the present invention is not a process and an apparatus for growing crystals by electrodeposition, but in the preferred embodiment, a method to produce a product which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material. Westfall does not discuss loading.

Thus, the present invention is novel and not anticipated by the cited art, Westfall. Nowhere in Westfall, or in any combination of the Examiner's art, is any aspect of the features of '691.

22. The Office states that Westfall discloses,
"Westfall further discloses that palladium can be deposited from the more common aqueous systems (see column 7, lines 25+).

Table 1 lists metals that can be grown from an aqueous solution, including palladium, and the more common anion and cation components."

THE TRUTH - Different Metals for Different Purposes with Different Loadings

Actually, US 5,215,631 discloses enlarging metal crystals as shown in figures 2a through 2d, therein with growth rates (deposition rates) of 4.2 feet per hour in linear growth rate (column 36 lines 17 through 22; said enlarging metal crystals shown in figures 2a through 2d, therein). The anode used in Westfall is the shaped to enhance the rate of growth of the crystal (column 5 lines 43 through 49). In contrast, the original specification and claims of the present invention, '691 claims a method to produce a product which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

The present invention uses hydrogen INSIDE a metal such as palladium for purposeful reasons, which are clearly different from the ions making large crystals quickly OUTSIDE the metal, such as described in Westfall. Attention is directed to the fact that in Westfall, unlike the present invention, there are enlarging metal crystals, ribbon crystalline growth systems, tin in its cubic and tetragonal forms, and crucibles using molten salt baths.

Westfall's invention, a process and an apparatus for growing crystals of tin in its cubic and tetragonal forms controls ions OUTSIDE of the enlarging metal crystals (figures 2a through 2d, therein). Westfall refers to saturation OUTSIDE of the metal crystal and is an entirely different teaching from the present invention. Westfall does not even discuss loading into the material (underlined in Examiner's quote for emphasis). Furthermore there is no mention of internal flows within any part of Westfall. Thus, it cannot read on the present invention, a method to produce a product which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said

isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

Corroborating this, Westfall admits that the apparatus of Westfall is no more than a means to a process and an apparatus for growing crystals by electrodeposition with rapid metal growth rates at 4.2 feet per hour (column 36 lines 17 through 22). Westfall admits it makes photovoltaic cells (column 13, lines 55 through 66). Westfall also admits that crucibles must be chosen which are able to survive corrosive molten salt baths (column 32 lines 55 through 59).

Attention is directed to the fact that the following elements shown in Westfall are not present, or needed, or claimed in the present invention. Said unneeded elements numbered in Westfall as bath (4, column 8, line 5), reference electrode (14), light source (18), stepping motor (22) and its mechanical connection to the cathode (8) are not needed in the present invention, as described in the original specification and claims, thereby proving the present invention has significant novelty and non-obviousness.

Where in Westfall are 691's two orthogonal applied electric fields, or having the second applied electric field intensity delivered after full charging?

Where in Westfall are 691's are there separate connections for the applied electric field intensities?

Where in Westfall are 691's is the cathode divided into parallel slabs and alternate deuteron-impermeable barriers?

Where in Westfall are 691's is the second electric field is directed through the pairs of barriers and electrode to enhance the desired reactions?

Where in Westfall are 691's are there deuteron impermeable barriers which are comb-shaped?

These elements of '691 are not present in Westfall.

Therefore, the material of Applicant's invention, '691, does not read on Westfall's process and an apparatus for growing crystals by electrodeposition, as the Examiner suggests.

The apparatus described in Westfall has none of the properties of the apparatus described in the present invention.

not
needed
in claim

This demonstrates they are different patents entirely with different uses, reasons, and methods.

23. The Office states that Westfall reads on,
"Conformal electric fields result in near uniform intensities and near uniform ion diffusion distances promoting superior deposition system stability (e.g., see column 24, lines 30+). Therefore, the orthogonal field resulting from a conformal counter electrode configuration and its beneficial effect on crystal formation read; respectively, on applicant's "second electric field" and it's effect of "redistribution of the fuel within the material."

The material of Applicant's invention, '691, does not read on Westfall's process as the Examiner suggests.

When hydrogen appears in Westfall it is not for loading. It is to the air as gas (column 9, line 35 through 43, especially lines 39 referring to "bubbling"). This is different from that used in the present invention which is loaded as taught in '691 in the present invention's original specification and claims, and will be explained in detail below. This "bubbling" of hydrogen in Westfall is not the different from this application which involves loading an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material, as discussed in the present invention's original specification and claims.

Furthermore, there is no mention of internal flows in the metal in Westfall. Furthermore, in Westfall all applied fields are synchronous, whereas in '691 they are metachronous (at different points in time).

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Furthermore, unlike the present invention, Westfall does not discuss loading. Furthermore there is no mention of internal flows within any part of Westfall. Corroborating this, in the present invention, the hydrogen sought is that within the palladium, which is not even discussed in Westfall.

US 5,215,631 discloses a process and an apparatus for growing crystals by electrodeposition which 1) involves ions other than hydrogen, 2) and they are on the OUTSIDE of the metal. Unlike the present invention, Westfall does not discuss loading. Furthermore there is no mention of internal flows within any part of Westfall. By contrast, the original specification and claims of the present invention, '691, claim a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

In the preferred embodiment, this device has two orthogonal applied electric fields with the second applied electric field intensity is delivered after full charging has been achieved. The deuteron impermeable barrier is comb-shaped labelled 55 and the cathode in the preferred configuration is divided into parallel slabs and alternate deuteron-impermeable barriers. Application of the second electric field is directed through the pairs of barriers and electrode to enhance the desired reactions. Where is this in the cited patent?

inst in claims

If the materials and elements used in Westfall, as suggested by the examiner, were to be used in the present invention, they would not function. Furthermore, if the present invention was used as discussed in Westfall, the materials of '691 would not even be functional. Temperatures required for Westfall are such that, "crucibles must be chosen which are able to survive the corrosive nature of the molten salt baths" (column 32 lines 55 through 59). If the present invention, '691, was used as described in Westfall, it would not even work.

24. The Office states that Westfall discloses,
"Westfall further discloses the use of orthogonal electric fields as part of the nucleation manipulation techniques for crystal growth control. It states that orthogonal electric fields are generated by the use of "nonformal" counter electrodes with configurations such as wire-tubular, sphere-spherical, cube-cubical torus-toroidal, etc. (see column 24, lines 11+).

Note also that the limitation of claims 3, 4 and 10 regarding the electric fields and their sequential application read on Westfall's aqueous electrochemical process. The electric field resulting from application of a voltage between the working electrode and counter electrode, which reads on applicant's "first electric field", primarily causes the movement of ions (including hydrogen ions) from the bath to the working electrode. This process reads on applicant's "loading isotopic fuel to the material." Westfall also discloses that the orthogonal fields, which result from a conformal counter electrode configuration, provide control of nucleation (see column 24, lines 1+)."

THE TRUTH - Different Locations of Flow

Actually, US 5,215,631 discloses growing enlarging metal crystals at impressive growth rates (deposition rates) of 4.2 feet per hour in linear growth rate (column 36 lines 17 through 22), used to make freestanding single crystals of tin in its cubic and tetragonal forms which Westfall then uses to make photovoltaic cells, as discussed in column 13, lines 55 through 66. Unlike the present invention, the anode used in Westfall is the shaped to enhance the rate of growth of the crystal (column 5 lines 43 through 49).

Saturation in the present invention involves **LOADING** of the hydrogen **INSIDE** the metal. This has nothing to do with Westfall. The applicant thanks the Examiner for pointing this out since there is a possible point of confusion and the applicant will correct the claims accordingly with replacement of saturation with "loading" which is not new material since it was mentioned in the original specification and claims.

Furthermore, in Westfall all applied electric field intensities are synchronous in time, whereas in '691 they are applied metachronously (at different points in time).

25. The Office states that Westfall reads on,
"Westfall also discloses conformal electric fields may be used in combination with one or more nucleation manipulation techniques, such as magnetic fields (see column 24, lines 55+)."

THE TRUTH -Catastrophic Flow differs from Electrochemical Throwing power

The material of Applicant's invention, '691, does not read on Westfall as the Examiner suggests. Westfall's enlarging metal crystals (figures 2a through 2d, therein) in ribbon crystal and crystalline growth systems have claims and teachings which are not the same as a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material, as discussed in the present invention's original specification and claims

26. The Office states that Westfall reads on,
"The bath is used by passing current between the working and counter electrodes (e.g. see column 4, lines 25+).

Clearly, the first electric field must first effect movement of ions from the electrolytic bath towards the working electrode before the orthogonal electric field can effect control of distribution of these ions to form the desired crystal growth."

THE TRUTH - Different Current Locations, Purposes, Time courses

The material of Applicant's invention, '691, does not read on Westfall's process and apparatus for growing crystals by electrodeposition, as the Examiner suggests. Westfall's product produces dendritic crystals with growth rates (deposition rates) of 4.2 feet per hour (column 36 lines 17 through 22) to make photovoltaic cells (column 13, lines 55 through 66).

Westfall's invention which is a process and an apparatus for growing crystals by electrodeposition is not the same as a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material,

means including barriers impermeable to the flow of said isotopic fuel within said material.

Therefore, the hydrogen which is OUTSIDE the crystal in Westfall, or producing hydrogen in Westfall, is different in purpose and use AS CLAIMED from the present invention. It is nonsense to consider Westfall's crystal growth being product removed through the growing metal crystal as the same as heat produced in the present invention. The applicant thanks the Examiner for pointing this out since there is a possible point of confusion and the applicant will correct the claims accordingly as it was mentioned in the original specification and claims. ✓ not in claim

Furthermore, in Westfall all applied electric field intensities are synchronous in time, whereas in '691 they are applied metachronously (at different points in time).

27. Claims 1, 2, 10 and 11 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Kinsella (U.S. 3,682, 806). As discussed below, the Applicant demonstrates that said rejection is an error.

The Office states,

"Applicant's claimed method of low temperature electrolytic nuclear reactions is practiced on an apparatus of non-cold fusion art (... Kinsella et al. [U.S. 3,682,806]) that is identical to the applicant's, and, these apparatuses are all operated in an identical manner, i.e., the application of orthogonal electric fields." "Kinsella et al. disclose a process for electroplating metallic articles with carboxylic film-forming materials utilizing lithium hydroxide as solubilizer (see Fig. 1 and column 8, 2nd paragraph). Fig. 1 shows the anode (4), which is the material to be coated, a stainless steel cathode (6). An alternative embodiment can have an auxiliary platinum anode (7) and an auxiliary stainless steel cathode (8)."

Kinsella --as it claims-- is simply a process for electroplating metallic articles with carboxylic film-forming materials in a process utilizing lithium hydroxide as solubilizer (see Fig. 1 and column 8, 2nd paragraph). Kinsella demonstrates the most rudimentary of an electroplating process and it does not have the purpose, advanced technology, features, and advantages of the present invention.

Kinsella, uses a stainless steel cathode, and only a one stage process. Kinsella uses no loading, or has no features of the present application. Corroborating this, from Kinsella, the Examiner quotes that 'Fig. 1 shows the anode (4), which is the

material to be coated, a stainless steel cathode (6)'. Furthermore, as additional further proof in Kinsella the text explicitly states, as the Examiner quotes 'An alternative embodiment can have an auxiliary platinum anode (7) and an auxiliary stainless steel cathode (8)'.

28. Kinsella leads away from the present invention as it uses a cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11), which are not needed in the present invention, as described in the original specification and claims.

In addition, Kinsella, (page 2, column 2, lines 7-15) teaches the loading current is into the volume of the cathode (in contrast to the cited patent). 7

Thus, the present invention, unlike Kinsella which uses methods well known to those who work in the art, is not an electroplating process of carboxylic film-forming materials, but in the preferred embodiment is a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal. The present invention uses a two-stage process, loading of hydrogen, a metal electrode such as palladium, a first stage of electrode loading, and a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal, for purposeful reasons, which are clearly different from the carboxylic film-forming processes described in Kinsella.

29. Corroborating this, attention is directed to the fact that the following elements shown in Kinsella are not present, or needed, or claimed in the present invention. Said unneeded elements numbered in Kinsella as 1 (cationic membrane to divide the cathodic compartment (column 9 line 65), 7 (a auxiliary platinum anode (column 10 line 15), 9 (a selective electrodialysis membrane to contain ion exchange resin (column 10 lines 19-23), and 11 (a solubilized feed makeup material introduced to the anode (column 10 line 11) are not needed in the present invention, as the described in the original specification and claims, thereby proving the present invention has significant novelty and non-obviousness.

If the materials and elements used in Kinsella, here the cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11), as suggested by the examiner, were to be used in the present invention, they would not function. Similarly, if the present invention, '691, was used as described in Kinsella, it would not be functional.

30. The present invention is a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material. In the preferred embodiment, this device has two orthogonal applied electric fields with the second applied electric field intensity is delivered after full charging has been achieved. The deuteron impermeable barrier is comb-shaped. Where is this in the cited patent?

The materials described in Kinsella do not have the properties of the materials described in the present invention.

The methods described in Kinsella are not the methods described in the present invention.

'691 is novel and not anticipated by Kinsella. Nowhere in Kinsella is any aspect of the features of '691.

31. The Office states,
"The electrodeposition current flows from the anode (4) to the stainless steel cathode (6)."

THE TRUTH - The Examiner's Current Analogies are Not Accurate

It is improper to compare Kinsella's 'electrodeposition current' to the present invention's well taught loading current.

In Kinsella, the loading current is onto the surface of the cathode in contrast to the cited patent which loads the volume for different purpose.

Kinsella electroplates metallic articles with carboxylic films (column 8, 2nd paragraph).

Unlike the present invention where there is a specialized palladium (or other hydrogen loading) cathode, in Kinsella, there is only a stainless steel cathode. Corroborating this, from Kinsella, the Examiner quotes that 'Fig. 1 shows the anode (4), which is the material to be coated, a stainless steel cathode (6)'. Furthermore, as additional further proof in Kinsella the text explicitly states, as the Examiner quotes 'An alternative embodiment can have an auxiliary platinum anode (7) and an auxiliary stainless steel cathode (8)'.

Further corroborating this, attention is directed to the fact that Kinsella leads away from the present invention as it uses a cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11) which are not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that in Kinsella, unlike the present invention where there is a specialized palladium (or other hydrogen loading) cathode, in Kinsella, there is only a stainless steel cathode, only a one stage process, no loading, and no features of the present application.

Even the currents are handled differently. Kinsella, (page 2, column 2, lines 7-15) teaches the loading current is into the volume of the cathode in contrast to the cited patent (*infra*).

32. The Office states that Kinsella discloses,
"An auxiliary direct current (referred to as "regeneration current") is applied between the auxiliary electrodes, the direction of the current being orthogonal to the direction of the electrodeposition current (see column 9, lines 65+)."

**THE TRUTH -REGENERATION CURRENT OUTSIDE A METAL
 HAS NOTHING TO DO WITH CATASTROPHIC FLOW CURRENT
 WITHIN A METAL**

'691 teaches and claims a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

Kinsella's process is for the purpose of electroplating metallic articles with carboxylic films.

Attention is directed to the fact that Kinsella uses an auxiliary platinum anode ("7", column 10 line 15) which is not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness.

Furthermore, in Kinsella all applied electric field intensities are synchronous in time, whereas in '691 they are applied metachronously (at different points in time).

33. The Office states that Kinsella reads on,
"Note that applicant's "isotopic fuel" in the claim language reads on the lithium anions that form on the anode, "material" reads on "anode", and "orthogonal electric fields" reads on the orthogonal fields produced by the electrodeposition current and the regeneration current."

**THE TRUTH - ELECTRODEPOSITION CURRENT IS NOT THE
 LOADING CURRENT**

The material of Applicant's invention, '691, does not read on Kinsella's an electroplating process carboxylic film-forming materials, as the Examiner suggests.

Kinsella's invention which is an electroplating process carboxylic film-forming materials which cannot be the same as a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said

material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

Kinsella --as it claims-- processes carboxylic film-forming materials with lithium hydroxide as solubilizer (see Fig. 1 and column 8, 2nd paragraph). This cannot read on the hydrogen of the present patent because the applicant uses hydrogen as the loaded material.

In addition, the 'anode' of Kinsella cannot be the 'material' because in the present patent, it is cathodically controlled and used for a different purpose.

The 'electrodeposition current' cannot read on 'loading of isotopic fuel into material' because in Kinsella, unlike the present invention where there is a specialized palladium (or other hydrogen loading) cathode, there is only a stainless steel cathode (6). Furthermore, Kinsella uses a cationic membrane to divide the cathodic compartment (number 1 in Kinsella, column 9 line 65), a regenerated ion exchange resin (column 10 line 14), a auxiliary platinum anode ("7", column 10 line 15), a selective electrodialysis membrane to contain ion exchange resin ("9" and "12", column 10 lines 19-23), and a solubilized feed makeup material introduced to the anode ("11", column 10 line 11) which are not needed in the present invention, or used therein for the purposes which Kinsella states. This proves that the present invention has significant novelty and non-obviousness.

Where in Kinsella are 691's two orthogonal applied electric fields, or having the second applied electric field intensity delivered after full charging?

Where in Kinsella are 691's are there separate connections for the applied electric field intensities?

Where in Kinsella are 691's is the cathode divided into parallel slabs and alternate deuteron-impermeable barriers?

Where in Kinsella are 691's is the second electric field is directed through the pairs of barriers and electrode to enhance the desired reactions?

Where in Kinsella are 691's are there deuteron impermeable barriers which are comb-shaped?

These elements of '691 are not present in Kinsella.

Kinsella's invention which is an electroplating process carboxylic film-forming materials is not the same as a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

LAW

34. In particular, as to Section 102 rejections, it is stated in M.P.E.P. 706.2 that:

'The distinction between rejections based on 35 USC 102 and those based on 35 USC 103 should be kept in mind. Under the former, the claim is anticipated (emphasis added) by the reference.'

Thus, the present invention, a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material, is novel, not obvious, and does distinguish from all previous art.

35. In this same connection, The Court of Customs and Patent Appeals said in *In re Arkely, Eardley and Long*, 172 U.S.P.Q. 524, 526 (CCPA, 1972):

'It is to be noted that rejections under 35 USC 103 are proper where the subject matter claimed 'is not identically disclosed or described'(emphasis by the Court) 'in the prior art,' indicating that rejections under 35 USC 102 are proper only when the claimed subject matter is identically disclosed or described in 'the prior art'.'

The Applicant has explained in detail (*supra*) how Westfall and Kinsella are different and therefore produce a different result from the present invention. Applicant has given lists of additional critical features and components which distinguish Applicant's invention to operatively function in a different manner to the cited art. Therefore, given the above, the independent claims, and hence all Claims 1, 5 through 8, 10 through 14, and 21 through 30, distinguish over the reference cited under Sec. 102 because they recite a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

Given the above, reconsideration with respect to novelty (Sec. 102) of Claims 1, 5 through 8, 10 through 14, and 21 through 30 is respectfully requested by the Applicant.

**The Novel Physical Features of the Claims Provide New
and Unexpected Results and Should be Considered
Unobvious Making the Claims Patentable Under Sec. 103**

36. Claims 1-7, 10-12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Cedzynska et al. (WO 93/01601) or Edwards (WO 90/15416) in view of Westfall.

Claims 8, 9 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Cedzynska et al. in view of Westfall, as applied to claims 1 -7, 10-12, and 14 above, and further in view of anyone of Edwards, Sadoway (WO 91/06959) or Van Noorden (NL 8909-962-A) or Dufour (WO 91/01036).

BACKGROUND: Westfall (US 5,215,631)

37. The Office states,

"Westfall discloses an electrodeposition process using orthogonal electric fields."

THE TRUTH - Different Purposes. Westfall makes growing crystals at 4.2 feet per hour

The applicant notes that the application '970 -of which the present invention '691 is a continuation of- was filed 9/17/91 prior to Westfall (June 1st 1993). In addition it precedes the filing date of Westfall (Oct. 11th, 1991). Nonetheless *in arguendo*, for the sake of argument, the applicant will now discuss Westfall in full detail to demonstrate that even if it was timely, which it is not, and if it were relevant to the present novel invention, which it is not.

US 5,215,631 discloses a process and an apparatus for growing large crystals by electrodeposition. Westfall, as discussed therein, grows enlarging metal crystals as shown in figures 2a through 2d, therein. Westfall's invention is to produce dendritic crystals and explicitly involves ribbon crystal and crystalline growth systems with growth rates (deposition rates) of 4.2 feet per hour in linear growth rate (column 36 lines 17 through 22). In Westfall, the crystals grow to become freestanding single crystals of tin in its cubic and tetragonal forms. Westfall uses said grown crystals to make photovoltaic cells, as discussed in column 13, lines 55 through 66.

Westfall's crystals, grown at 4.2 feet per hour, do not have the purpose, advanced technology, features, and advantages of the present invention. Unlike Westfall, '691 teaches a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material. This is clearly shown in the Figure 2, and discussed, in the original specification of 691.

Furthermore, in Westfall all applied electric field intensities are synchronous in time, whereas in '691 they are applied metachronously (at different points in time).

BACKGROUND: Cedzynska et al. (WO 93/01601)

38. The Office states,

"Cedzynska et al. disclose a method for electrolytically loading isotopic hydrogen into a palladium or palladium alloy electrode by alternately charging and discharging the electrode in a plurality of cycles, each cycle including charging of the electrode with isotopic hydrogen approximately to a saturation level and the discharging the electrode to a predetermined retention level see Abstract, page 9 and Fig. 1)."

Cedzynska et al. (WO 93/01601) is a rudimentary Fleischmann-pons system which has the modification of "alternately charging and discharging electrodes".

Cedzynska et al. (WO 93/01601) has a filing day of July 8, 1992. The applicant notes that the application '970 -of which the present invention '691 is a continuation of- was filed 9/17/91. Nonetheless *in arguendo*, for the sake of argument, the applicant will now discuss Cedzynska in full detail to demonstrate that even if it was timely, which it is not, and if it were relevant to the present novel invention, which it is not.

In fact, attention is directed to the fact that Cedzynska leads away from the present invention as it uses a rudimentary Fleischmann-pons system and "alternately charging and discharging electrodes". This proves that the present invention has significant novelty and non-obviousness. Cedzynska et al. does not have any of the features of the present invention.

BACKGROUND: Edwards (WO 90/15416)

39. The Office states,

"Edwards disclose a method for production of thermal energy comprising passing an electric current through electrodes immersed in a liquid electrolyte containing a higher isotope of a low atomic weight atom and applying a magnetic influence to the electrolyte or one or each electrode. The electrolyte may contain lithium and the electrode can be palladium or titanium (see Figs. 1 and 2, and claims)."

Edwards (WO 90/15416) is a simple Fleischmann-Pons system with a rudimentary magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18). The orientation is not given. Electrolysis is taught. In fact, attention is directed to the fact that Edwards leads away from the present invention as it uses a simple Fleischmann-Pons system and a rudimentary magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18). The orientation is not given. Electrolysis is taught. Edwards does not have any of the features of the present invention.

BACKGROUND: Sadoway (WO 91/06959)

40. Sadoway (WO 91/06959) is a simple Fleischmann-Pons system. According to Sadoway the applied magnetic field comes from an electromagnetic or a permanent magnet which is used to "enhance fusion initiation" [Page 6, line 13]. Sadoway (WO 91/06959) has an international filing day of October 25th 1990 and a priority day of October 25, 1989. In fact, attention is directed to the fact that Sadoway leads away from the present invention as it uses a simple Fleischmann-Pons system and a magnetic field to "enhance fusion initiation" [Page 6, line 13]. With all the respect, Swartz (SN 07/371,937, filed June 27, 1989, now SN 09/750,480) was the first to use magnetic fields to improve fusion and enhance the fusion rates. In the present invention, 691, there is used an applied magnetic field which is spatially inhomogeneous and is used to extract products based on differential magnetic susceptibilities. This is a very different from the use of the magnetic field in Sadoway or Swartz (SN 07/371,937, now SN 09/750,480). Sadoway does not have any of the features of the present invention.

BACKGROUND: Van Noorden (NL 8909-962-A)

41 Van Noorden (NL 8909-962-A) is invention for a simple Pons and Fleischmann system used to generate neutrons. Van Noorden uses a very homogeneous magnetic field through means of "an electric coil in which the electrolysis cell is mounted". Van Noorden (NL 8909-962-A) is dated 12/1/89. In fact, attention is directed to the fact that Van Noorden leads away from the present invention as it uses a simple Pons and Fleischmann system, generates neutrons, and has a very homogeneous magnetic field through means of "an electric coil in which the electrolysis cell is mounted". Simple electrodynamics reveals that the magnetic field intensity is nearly constant therein. There is no planned applied spatial inhomogeneity. Furthermore, Van Noorden (NL 8909-962-A) is dated 12/1/89. With all the respect, Swartz (SN 07/371,937, filed June 27, 1989, now SN 09/750,480) was the first to use magnetic fields to improve fusion and enhance the fusion rates (July 1989). In the present invention, 691, there is used an applied magnetic field which is spatially inhomogeneous and is used to extract products based on differential magnetic susceptibilities. This is a very different from the use of the magnetic field in Sadoway or Swartz (SN 07/371,937, now SN 09/750,480). This proves that the present invention has significant novelty and non-obviousness.

Van Noorden (NL 8909-962-A) uses a simple Pons and Fleischmann system, a neutron generating subsystem, and a very homogeneous magnetic field. It is constant therein. There is no extraction. There is no planned applied inhomogeneity. Van Noorden does not have any of the features of the present invention.

BACKGROUND: Dufour (WO 91/01036)

42. Dufour (WO 91/01036) is a simple Fleischmann-Pons apparatus, and has a filing day of July 6, 1990. In fact, attention is directed to the fact that Dufour leads away from the present invention as it uses said simple Fleischmann-Pons apparatus with a voltage source with a "pulse operating range of 10 hertz to 1 MHz" (page 10), which is not needed in the present invention, as the described in the original specification and claims. This proves that the present invention has significant novelty and non-obviousness. Dufour does not have any of the features of the present invention.

BACKGROUND: Koretzky (3,407,126)

43. Koretzky, 3,407,126, is a method of electrodeposition onto a magnetic thin film on its surface by maintaining the pH at 2.4 to 3.0 and by using a thickening agent such as methyl vinyl ether and maleic anhydride and hydroxypropyl carboxy methyl cellulose. Koretzky, 126, that was sent by the examiner is missing all of its content except for the first three figures and columns five insects.

BACKGROUND: Salisbury (4,416,845)

44. Salisbury 4,416,845, relates to the control of ions orbiting in a "cylindrical reaction space in two counter flow streams". It is used to "focus the ions of both streams into a predetermined orbital reaction zone". It uses an ion beam source (16), beam from said source (17), liners to absorb energy (29a), and a central magnetic field in windings (14 and 15) to produce the field across the gaps 111 and 13 which force "spiral paths for introduction in to the electric field confinement space" (column 4, lines 10-15).

BACKGROUND: Booth, (5,545,429)

45. Booth, 5,545,429, is a process for full metallization growth of thru-holes in a polymer structure, which allows the creation of double sided fully metallized thru-holes in any polymer structure. Booth uses a temporary removable cathode, a film-forming conductive polymer -- polyimide-siloxanes as a thermoplastic material. Booth uses a pump (20), a filter (22), a filter tube (24), a paddle terminal (12), and a narrow gap (28).

The applicant notes that the application '970 -of which the present invention '691 is a continuation of- was filed 9/17/91 prior to Booth (7/1/94). Nonetheless *in arguendo*, for the sake of argument, the applicant will now discuss Booth in full detail to demonstrate that even if it was timely, which it is not, and if it were relevant to the present novel invention, which it is not.

BACKGROUND: Hirsch, (3,530,497)

46. Hirsch, 3,530,497, is an apparatus to generate fusion reactions by creating ions moving around a common radius such that the ions streams are in a favorable position. Hirsch requires a thermionic cathode, which is ion permeable and circular (20), a grid (22), a neutral gas at low pressure which is used in ionized form (column 4, lines 3 through 8). The results is particle trapping or confinement at high

density by force charge separation in spherical geometry (column 4, lines 43 through 48). Hirsch requires an annular mounting plate (58), a respective hemisphere (51), and serpentine tracts through the grid to contribute to ionization of neutral gas (columns 7, lines 20 to 30).

BACKGROUND: Gerdon, (5,372,701)

47. Gerdon, 5,372,701, is a process an apparatus for electroplating an object and removing the excess electroplating solution from the electroplated objects, so as to eliminate waste rinse solution. Gerdon uses a pump (7), with ingress and egress lines (8), and an electroclean bath (1), a stagnant rinse bath (2), and uses zinc electroplating solution containing zinc chloride and potassium chloride.

The applicant notes that the application '970 -of which the present invention '691 is a continuation of- was filed 9/17/91 prior to Gerdon (12/1/91). Nonetheless *in arguendo*, for the sake of argument, the applicant will now discuss Westfall in full detail to demonstrate that even if it was timely, which it is not, and if it were relevant to the present novel invention, which it is not.

48. The Office states,

"Either one of Cedzynska et al. or Edwards et al. disclose the applicant's claims except for the orthogonal electric fields. One having ordinary skill in the art would have recognized that the method and apparatus of Cedzynska et al. or Edwards are similar to that of Westfall in terms of having an electrochemical means of depositing a light element such as hydrogen into a metal such as palladium. He would have also recognized that application of orthogonal electric fields is advantageous because it provides better control of the process."

THE TRUTH -

This present invention is novel and not anticipated by the cited art, Westfall, Cedzynska and Edwards. Nowhere in Westfall, Cedzynska and Edwards, or in any combination of the Examiner's art, is any aspect of the features of '691.

The present invention, '691 involves the solid state and not plasma physics:

Even the applied magnetic field spatial homogeneity and the way the applied magnetic field is used are different.

Furthermore, in Westfall applied electric field intensities are synchronous in time, whereas in '691 they are applied metachronously (at different points in time).

Furthermore, in the present invention, additional techniques are used and features exist, unlike Cedzynska and Edwards.

Cedzynska and Edwards include none of the features of the present invention.

Edwards discloses a simple Fleischmann-Pons system with a rudimentary magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18). The orientation is not given. Electrolysis is taught.

Cedzynska et al. (WO 93/01601) is a rudimentary Fleischmann-Pons system which has the modification of "alternately charging and discharging electrodes".

Attention is directed to the fact that the following elements shown in Edwards are not present, or needed, or claimed in the present invention. Edwards uses a simple Fleischmann-Pons cell, and electrolysis is taught. The magnetic field is used "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18). The orientation is not given. Said unneeded elements numbered in Edwards are not needed in the present invention, as the described in the original specification and claims, thereby proving the present invention has significant novelty and non-obviousness. Furthermore, Swartz (SN 07/371,937, filed June 27, 1989, now SN 09/750,480) was the first to use magnetic fields to improve fusion and enhance the fusion rates. In the present invention, 691, there is used an applied magnetic field which is spatially inhomogeneous and is used to extract products based on differential magnetic susceptibilities. T

49. If the present invention, '691, was used as described in Cedzynska, it would not even work. If the present invention, '691, was used as described in Edwards, it would not even work. If the materials and elements used in Edwards, here the simple Fleischmann-Pons cell, electrolysis sought, is taught, etc., as suggested by the examiner, were to be used in the present invention, they would not function.

This present invention has which has nothing to do with Cedzynska's Fleischmann-pons cell and alternately charging and discharging electrodes".

This present invention has which has nothing to do with Edwards's simple Fleischmann-Pons system and rudimentary magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode ..." (page2, lines 15 through 18), which the Examiner suggests.

50. The Office states that,
"One having ordinary skill in the art would have recognized that the fusion apparatus of Westfall produces the same charged particle products as those produced by either one of Cedzynska or Edwards, and the use of a magnetic field to remove the fusion products in Westfall's would have been prima facie obvious."

THE TRUTH - DIFFERENT TYPES OF MAGNETIC FORCES USED

First, Westfall does not produce charge particles but uses ions until they deposit (in neutral state) onto the surface of his electrode. In the present invention the material loads into the material and is used thereafter therein. However, for the sake of argument, in arguendo, even supposing that Westfall did, neither Cedzynska or Woolsey are even remotely like, or have the same methods of, or configuration of, or have the same purpose of, the present invention. Most importantly, the present invention separate a product but attention is directed to the fact that Cedzynska and Edwards and the other cited art use an entirely different and distinguishable principle.

Edwards demonstrate the most rudimentary of use of a rudimentary magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18). Swartz (SN 07/371,937, filed June 27, 1989, now SN 09/750,480) used magnetic fields to improve fusion rates. In the present invention, '691, there is used an applied magnetic field which is spatially inhomogeneous and is used to extract products based on differential magnetic susceptibilities. This is a very different from the use of the magnetic field in Sadoway or Swartz (SN 07/371,937, now SN 09/750,480).

The most developed cited art use of magnetic fields are in Salisbury and Hirsch. They use an entirely different and distinguishable principle from the above-entitled application which involves the use of a magnetic field intensity differently from the cited art (which use a magnetic field intensity in a magnetohydrodynamic system, as is well-known, supra). By contrast, '691 teaches an extraction procedure using a spatially inhomogeneous magnetic field intensity which has forces which goes as $(\mu H) * (\mu H)$, and not $(v \times \mu H)$ as taught in Salisbury, Hirsch and the other cited art.

PUMPING ACTION BY A SPATIALLY INHOMOGENOUS MAGNETIC FIELD

51. As specified in the original disclosure: The pumping action upon products [other than heat] is from the action of an applied force exerted upon said product (in this case an isotope of hydrogen: tritium). The generation, and calculation, of the force induced by an applied magnetic field intensity upon the desired isotope which is generated within the CAM reactor, is derived as follows.

"An inhomogenous magnetic field intensity is applied by coil labelled 300 to one portion of the cathode (1). Said magnetic field is driven by the power supply (labelled 301) in the figure. The spatially inhomogenous magnetic field could also be created by a superconductor."

[07/760,970; the present application in Continuation; Underline added for emphasis]

Ampere's Law is used to calculate the line integral of the magnetic field intensity around the applied electric current. That magnetic field intensity exists mainly in the gap between the high permeability rod (around which the coil has been wound) and includes the volumes encompassing the desired isotope [cf. Figure 18 of the original specification].

"The differential magnetic susceptibility between isotopic fuel and the nuclear fusion product is used to magnetically pump the product to and through the barrier labelled 350. At that location there is a buildup of the isotope with the larger magnetic susceptibility due to said differential magnetic susceptibility."

[07/760,970; the present application in Continuation]

The magnetic field intensity can be derived by inspection in the gap region based upon Gauss' Law, which implies that the divergence of the magnetic flux density is zero. Therefore, the use of a volume with one surface abutting the volume containing the desired isotope and the other surface abutting the end of said rod, results in a ratio between the two magnetic fields.

The magnetic field as taught in the above-entitled application is spatially inhomogeneous. The original specification and claims of the present invention also taught and claimed a separation system to extract an precise product - another feature of great utility.

A magnetic field inhomogeneity, based upon the differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21], creates forces which make this a

"non-linear device in the sense that the containment field distribution is spatially non-uniform. ... the ... invention is therefore a chemical collection device."

[Straus Declaration 1994]

52. The magnetic force, resulting from the applied magnetic field, is the spatial derivative of the magnetic coenergy with respect to distance.

"The magnetic force resulting from the applied magnetic field is the derivative of the magnetic coenergy with respect to distance in the axial direction, and is proportional to the square of the current, the square of the number of turns in the coil (300), and said differential magnetic susceptibility. The products are removed at the product barrier (labelled 350). If said isotopic product is of lower magnetic susceptibility, then the coil is moved toward the portion of the cathode near to the solution (6)."

[07/760,970; the present application in Continuation]

As an alternative means of calculating the applied magnetic force upon the desired isotope is to use the Maxwell Stress Tensor. The Maxwell Stress Tensor is based upon the orthogonal, and parallel, components of the magnetic field intensity over the surface of the desired isotope. The stress tensor is quite complex. The calculated force is based upon the spatial divergence of the stress tensor. Both methods of deriving the magnetic force are identical

These solutions are extremely complex but an introduction to this physics in a far simpler system [as regards ferrofluids and not the more complicated invention and products of the above-entitled application] is available in "Electromechanical Dynamics", Part III, Elastic and Fluid Media, H. Woodson, J. Melcher, J. Wiley & Sons, Inc., NY (1968), pages 772 to 777 [cf. figures 12.2.21 and 12.2.24].

The important result, as stated in the original specification, is that energy of the entire system decreases by the movement of the higher susceptibility isotopes towards, and into, the region containing the greatest magnetic field intensity.

53. In summary, Westfall and Cedzynska and Edwards are different and distinguishable from applicant's claims and have none of the features of the present invention. The present invention extracts differently than Cedzynska or Edwards (supra) and are different and distinguishable from applicant's claims and have none of the features of the present invention. Corroborating this, attention is now directed to the fact that in when the present invention separates product by an inhomogeneous applied magnetic field intensity. Cedzynska and Edwards do not have the advanced technology, features, and advantages of the present invention.

This present invention is a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material. In the preferred embodiment, this device has two orthogonal applied electric fields with the second applied electric field intensity is delivered after full charging has been achieved. The deuteron impermeable barrier is comb-shaped labelled 55 and the cathode in the preferred configuration is divided into parallel slabs and alternate deuteron-impermeable barriers. Application of the second electric field is directed through the pairs of barriers and electrode to enhance the desired reactions. This is novel and not anticipated by the cited art. Nowhere in Edwards, Cedzynska, Westfall, or in any combination of the Examiner's cited art, is any aspect of the features of '691. Thus, the material of Applicant's invention, '691, does not read on Westfall with Cedzynska or Edwards, as the Examiner suggests, and therefore, the present application is a novel and nonobvious.

54. The Office states,
"Cedzynska-Westfall/-Edwards, Sadoway, Van Noorden, or Dufour
The combination of Cedzynska et al. and Westfall disclose the applicant's claims
except for the use of magnetic fields in fusion.
Anyone of the cited secondary references cites the application of a magnetic field as
part of a claimed electrolysis-nuclear fusion process. See for example page 2 of
Westfall, abstract and claims of Sadoway, abstract of Van Noorden, and page 8 of
Dufour. "

**THE TRUTH - EXTRACTION GOES AS H^2 DIFFERING FROM
 CITED ART**

This present invention is novel and not anticipated by the cited art, Westfall, Edwards, Sadoway, Van Noorden, or Dufour. Nowhere in Westfall, Edwards, Sadoway, Van Noorden, or Dufour or in any combination of the Examiner's art, is any aspect of the features of '691.

The present invention, '691 involves the solid state and not plasma physics.
 Even the way the magnetic fields used are different.

Furthermore, in the present invention, additional techniques are used and features exist, unlike Edwards, Sadoway, Van Noorden, or Dufour.

Edwards, Sadoway, Van Noorden, or Dufour include none of the features of the present invention.

Edwards, Sadoway, Van Noorden, or Dufour demonstrate the most rudimentary of use of a magnetic field, which is entirely different and distinguishable principle from the above-entitled application.

Edwards, Sadoway, Van Noorden, or Dufour use an entirely different and distinguishable principle from the above-entitled application which involves the use of a magnetic field intensity differently from Edwards, Sadoway, Van Noorden, or Dufour. By contrast, '691 teaches an extraction procedure using an inhomogeneous magnetic field intensity which has forces which goes as $(m H)^2$ (m H), and not $(v \times m H)$.

55. Edwards (WO 90/15416) is a simple Fleischmann-Pons system with a rudimentary magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18).

Sadoway (WO 91/06959) is a simple Fleischmann-Pons system with an applied magnetic field to "enhance fusion initiation" [Page 6, line 13].

Van Noorden (NL 8909-962-A) is invention for a simple Pons and Fleischmann system used to generate neutrons. Van Noorden uses a very homogeneous magnetic field through means of "an electric coil in which the electrolysis cell is mounted". It is constant therein. There is no extraction. There is no planned applied inhomogeneity.

Dufour (WO 91/01036) is a simple Fleischmann-Pons apparatus, with a voltage source with a "pulse operating range of 10 hertz to 1 MHz" (page 10).

Attention is directed to the fact that the following elements shown in

Edwards (WO 90/15416), magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18), electrolysis sought, are not needed in the present invention, thereby proving the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that the following elements shown in Van Noorden (NL 8909-962-A) generator of neutrons, very homogeneous magnetic field, are not needed in the present invention, thereby proving the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that the following elements shown in Dufour (WO 91/01036), a voltage source with a "pulse operating range of 10 hertz to 1 MHz" (page 10), are not needed in the present invention, thereby proving the present invention has significant novelty and non-obviousness.

56. If the present invention, '691, was used as described in Edwards, it would not even work. If the materials and elements used in Edwards, here the simple Fleischmann-Pons system with a rudimentary magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18), etc., as suggested by the examiner, were to be used in the present invention, they would not function. This present invention has which has nothing to do with Edwards' simple Fleischmann-Pons cell or magnetic field "to distort electrically charged species forming during the electrolysis ..." (page2, lines 15 through 18).

57. If the present invention, '691, was used as described in Sadoway, it would not even work. If the materials and elements used in Sadoway, here the simple Fleischmann-Pons system with a rudimentary magnetic field to "enhance fusion initiation" [Page 6, line 13], etc., as suggested by the examiner, were to be used in the present invention, they would not function. This present invention has which has nothing to do with Sadoway's simple Fleischmann-Pons cell or magnetic field to "enhance fusion initiation" [Page 6, line 13].

58. If the present invention, '691, was used as described in Van Noorden, it would not even work. If the materials and elements used in Van Noorden, here the simple Fleischmann-Pons system with neutron subsystem, very homogeneous magnetic field through means of "an electric coil in which the electrolysis cell is mounted", and with no extraction., etc., as suggested by the examiner, were to be used in the present invention, they would not function. This present invention has which has nothing to do with Van Noorden's simple Fleischmann-Pons cell, neutron subsystem, very homogeneous magnetic field, and lack of extraction.

59. If the present invention, '691, was used as described in Dufour, it would not even work. If the materials and elements used in Dufour, here the simple Fleischmann-Pons system with with a voltage source with a "pulse operating range of 10 hertz to 1 MHz" (page 10), etc., as suggested by the examiner, were to be used in the present invention, they would not function. This present invention has which has nothing to do with Dufour's simple Fleischmann-Pons cell or with a voltage source with a "pulse operating range of 10 hertz to 1 MHz" (page 10).

60. Attention is directed to the fact that the following elements shown in Edwards (WO 90/15416), magnetic field "to distort electrically charged species forming during the electrolysis process at the anode or cathode to control the rate of fusion of charge atoms" (page2, lines 15 through 18), electrolysis sought, are not needed in the present invention, thereby proving the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that the following elements shown in Van Noorden (NL 8909-962-A) generator of neutrons, very homogeneous magnetic field, are not needed in the present invention, thereby proving the present invention has significant novelty and non-obviousness.

Attention is directed to the fact that the following elements shown in Dufour (WO 91/01036), a voltage source with a "pulse operating range of 10 hertz to 1 MHz" (page 10), are not needed in the present invention, thereby proving the present invention has significant novelty and non-obviousness.

61. In summary, Westfall, Edwards, Sadoway, Van Noorden, and Dufour are different and distinguishable from applicant's claims and have none of the features of the present invention which is a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material. When extraction is used, the present invention extracts differently than Edwards, Sadoway, Van Noorden, or Dufour (supra) and are different and distinguishable from applicant's claims and have none of the features of the present invention. Corroborating this, attention is now directed to the fact that in when the present invention separates product, attention is directed to the fact that with MHD the separation is outside of the site of the reactions, which is quite different from this application where an inhomogeneous applied magnetic field intensity is used within the system to extract product. Edwards, Sadoway, Van Noorden, or Dufour do not have the advanced technology, features, and advantages of the present invention.

This present invention is novel and not anticipated by the cited art, Wooley. Nowhere in Wooley, Lasche, Furuya, Westfall, Kinsella, Patterson, or in any combination of the Examiner's cited art, is any aspect of the features of '691. Thus,

the material of Applicant's invention, '691, does not read on Furuya with Edwards, Sadoway, Van Noorden, or Dufour, as the Examiner suggests, and therefore, the present application is a novel and nonobvious.

LAW

62. With respect to evaluation of claims under 35 U.S.C. 103, 'every portion of the ... claims must be considered in determining ... obviousness' [emphasis added; *In re Duva*, 156 USPQ 90, 94 (CCPA 1967)]. The Court, in reversing the Office in *In re Kuderna and Phillips*, 165 USPQ 575, 578- (CCPA 1970), referred to the 'sum of the relevant teaching in the art, ' pointing out that the Office is not allowed to 'view ... first one and then another of isolated teachings' when determining that 'the subject matter as a whole would have been obvious at the time the invention was made', as required by 35 U.S.C. 103. Particularly pertinent is *In re Shuman and Meinhardt*, 150 USPQ 54, 57 (CCPA 1966) wherein the court said:

'References are evaluated by ascertaining the facts fairly disclosed therein as a whole. It is impermissible to first ascertain It is factually what appellants did and then view the prior art in such a manner as to select from the random facts of that art only those which may be modified and the utilized to reconstruct appellant's invention from such prior art. [Emphasis added.]

It is basic that the claims define the invention. The courts have said that:

'All words in a claim must be considered in judging the patentability of that claim against the prior art ... ', *In re Wilson*, 165 USPQ 494 (CCPA 1970). The terms in the claims 'should be given the meaning they would have 'to one of ordinary skill in the pertinent art when read in the light of and consistently with the specification ...', *In re Benson and Tabbott*, 169 USPQ 548, 552 (CCPA 1971).

63. The Court of Custom and Patent Appeals in *In re Langer and Haynes*, 175 USPQ 169, 171 (CCPA 1972) and as to a rejection based upon prior art teachings, said:

'This court has said that '(a)ll of the disclosures in a reference must be evaluated for what they fairly teach (emphasis added) one of the ordinary skill in the art.'

Where is the method of the claims taught in the references? How were all portions of the claims considered in determining obviousness? Does Westfall,

Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour act as a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material, as the Examiner purports? No.

Does Westfall, Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour extract product using an inhomogeneous magnetic field intensity which has forces which go as $(mH)^2$ as the Examiner purports? No.

The figures and claims of Westfall, Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour are intended to, and do, serve a different purpose than does the figures and Claims 1, 5 through 8, 10 through 14, and 21 through 30 in the present invention, and Edwards, Sadoway, Van Noorden, or Dufour adds nothing of substance to Westfall.

None of the references to which the Examiner refers are concerned with THIS APPLICATION'S novel means to a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material, followed by extraction of product using an inhomogeneous magnetic field intensity which has forces proportional to $(mH)^2$.

None of the references suggests, alludes to, or teaches a structure as defined by the Claims 1, 5 through 8, 10 through 14, and 21 through 30 of this invention of Figure 2, therein.

Unsuggested Combination:

64. There is no suggestion in the references themselves that they be combined, or could be combined.

Where was the suggestion of the desirability of the modification? Indeed, neither of the references suggests, alludes to, or teaches a structure as defined by the claims of this invention, and as should be apparent?

The need for the prior art references themselves to suggest that they can be combined is well known. Therefore, of what relevance then is Westfall, Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour?

On the matter of applying references to claimed subject matter [eg. cf. *In re Mercier*, 185 U.S.P.Q. 774, (CCPA, 1975)]:

'These and other questions arise because the board's approach fails to recognize that all of the relevant teachings of the cited references must be considered in determining what they fairly teach to one having ordinary skill in the art. * * * 'The relevant portions of a reference include not only those teachings which would suggest particular aspects of an invention to one having ordinary skill in the art, but also those teachings which would lead such a person away from the cited invention.'

65. As was stated in *In re Sernaker*, 217 U.S.P.Q. 1,6 (CAPC 1983):

'(P)rior art references in combination do not make an invention obvious unless something in the prior art references would suggest that advantage to be derived from combining their teachings.'

The suggestion to combine the references should come from the prior art, rather than from applicant. As was forcefully stated in *Orthopedic Equipment Co. Inc. v. United States*, 217 U.S.P.W. 193, 199 (CAPC 1983):

'It is wrong to use the patent in suit [here the patent application] as a guide through the maze of prior art references, combining the right references in the right way to achieve the result of the claims in suit [here the claims at issue]. Monday morning quarterbacking is quite improper when responding the question of nonobviousness in a court of law [here the Office].'

Indeed, what the Office has done here is to

'pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art'

[*In re Umbrecht*, 160 USPQ 15, 19 (CCPA 1968)].

There is no teaching in the references that would support the combination the Office uses to reject the claims. The applicable law will now be noted in greater detail.

66. In order to combine references there must be a 'suggestion of the desirability' of the combination, *In re Noznik, Tatter and Obenauf*, 178 USPQ 43, 45 (CCPA 1973). That holding is the reason why the origin of the combination must be given weight -- not only the possibility of such combination; see the reference to 'motivation or reason in *Chicago Rawhide* {**} which focuses quite clearly on the rationale of recent decisions of the Court of Appeals for the Federal Circuit (CAFC) on the issue of obviousness, as discussed, for example, in *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984), wherein the court said at page 1127:

'The mere fact that the prior art could be so modified should not have made the modification obvious unless the prior art suggested the desirability of the modification. [Emphasis added]

[{**} *Ex parte Chicago Rawhide Manufacturing Co.*, 223 USPQ 351, 353 (Bd. of App. 1984)]

There would be no reason for one skilled in the art to combine such disparate references such as *Westfall*, *Cedzynska*, *Edwards*, *Sadoway*, *Van Noorden*, or *Dufour* to purportedly obtain the present invention as the Examiner has done. Furthermore, there is no suggestion in the references themselves that they be combined, or could be combined that way. Thus the applicant submits that any combination of *Westfall* with *Westfall*, *Edwards*, *Sadoway*, *Van Noorden*, or *Dufour* is an improper one, absent any showing in the references themselves that they can or should be so combined.

67. In the present case, the rejection of certain claims uses the *Westfall* patent [which is related to electroplating] located far afield from *Cedzynska*, *Edwards*, *Sadoway*, *Van Noorden*, or *Dufour* which are in the fields of cold and hot fusion. The applicant submits that any combination of them is an improper one, absent any showing in the references themselves that they can or should be so combined.

Where was the suggestion of the desirability of the modification? Indeed, what the Office has done here is to 'pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art', *In re Umbrecht*, 160 USPQ 15, 19 (CCPA 1968). There is no teaching in the references that would support the combination the Office uses to reject Claims 1-14. Indeed, none of the references suggests, alludes to, or teaches a structure as defined by Claims 1, 5 through 8, 10 through 14, and 21 through 30, or shown in Figure 2, and as should be apparent to the Office.

Thus the applicant submits that any combination of Westfall with Edwards, Sadoway, Van Noorden, or Dufour or the other art is an improper one, absent any showing in the references themselves that they can or should be so combined.

68. None of the references suggests, alludes to, or teaches the structure as defined by Claims 1, 5 through 8, 10 through 14, and 21 through 30. As said in *Ex parte Fleischmann*, 157 USPQ 155, 156 (Bd. of Appeals 1967):

'While as an abstract proposition it might be possible to select features from the secondary references, as the examiner has done, and mechanically combine them with the (other citation) to arrive at appellant's claimed combination, we find absolutely no basis for making such combination neither disclosed nor suggested in the patents relied on.'

On the matter of combining references under section 103, no better expression of the law is found than that in *Higley v. Brenner*, *Com. Pats.*, 155 USPQ 481, 484 (CA DC 1967):

'The obviousness question here revolves around the Patent Office's combining prior references. Reliance may properly be placed on such a combination to negative patentability where the applicant's subject matter is suggested or 'taught' by the prior references. Application of Van Deventer, 223 F.2d 274, 276 106 USPQ 121, 123 (CCPA 1955); Application of Demarche, 219 F.2d 952, 956, 105 USPQ 65, 69 (CCPA 1955).'

'The test of obviousness, however, must be applied as of the time of the invention and not retrospectively as of the time of the suit. Many things may seem obvious after they have been made and for this reason courts should guard against slipping into the use of hindsight'.

Attention is directly to the fact that both Edwards, Sadoway, Van Noorden, or Dufour involve use of a magnetic field using the Lorentz force with the cross-product force ($v \times m H$). By contrast, the present invention uses a different group of materials, for a different group of functions, and a different final result. Thus, the present invention is not involved in using the Lorentz force, but teaches an extraction procedure using an inhomogeneous magnetic field intensity which has forces which goes as $(m H) * (m H)$, and not $(v \times m H)$ as taught in Edwards, Sadoway, Van Noorden, or Dufour. Simply put, the present invention does not use magnetohydrodynamic systems to produce electric energy directly from a nuclear fusion device involving a liquid lithium as taught in Lasche and Wooley. The Examiner's use of Westfall and Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour is improper.

The materials used in Westfall, Edwards, Sadoway, Van Noorden, or Dufour do not function as the active material used in the present invention. Furthermore, the use of liquid lithium, solid lithium, liquid metal blankets and plasmas in Lasche and Wooley, are quite different from the present invention.

Simply put, the figures and claims of Westfall, Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour are intended to, and do, serve a different purpose than does the structure defined by claims herein, and Edwards, Sadoway, Van Noorden, or Dufour add nothing of substance to Westfall. Thus the applicant submits that any combination of Westfall with Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour is an improper one, absent any showing in the references themselves that they can or should be so combined.

The Examiner's use of Furuya and either Lasche or Wooley is improper. The present invention (Fonfer figure 2) has a system which is incompatible with both Westfall and Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour, and would not survive therein.

If either Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour were used in the present invention, or placed in any way into the present invention, the combination would not function. The Examiner's use of Westfall and Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour is improper.

The Examiner's connecting Westfall and either Cedzynska, Edwards, Sadoway, Van Noorden, or Dufour is improper.

Furthermore, how were all portions of the claims considered in determining obviousness?

There is not a fair standard of review.

69. The suggestion to combine the references should come from the prior art, rather than from Examiner.

In the present case, the rejection of claims under 35 U.S.C. 103(a) uses the Westfall patent [which is related to producing heat from loaded palladium using the simple technique of F+P modified by a surface layer and is not the present invention which involves a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material], and then uses the incorrectly extracted patents from the field of producing electric energy directly from thermonuclear reactors by way of a magnetohydrodynamic systems using hot liquid metal.

Thus, the Examiner has rejected the claims on the basis of 'random facts' in the art cited and has modified those random facts in a manner without 'motivation or reason' derived from those random facts [Chicago-Rawhide]. However, even picking and choosing bits and pieces of the various references as the Office has done here, does not lead one to the invention as defined by Claims 1, 5 through 8, 10 through 14, and 21 through 30 .

**ADDITIONAL REASON OVERCOMING THE EXAMINER'S
POSITION REGARDING USC 103**

The Cited but Non-Applied References

70. The cited but not applied references have been studied but are submitted to be less relevant than the relied upon references.

**ADDITIONAL REASON OVERCOMING THE EXAMINER'S
POSITION REGARDING USC 103**

Additional Reasons Militate In Favor of Unobviousness

71. The applicant respectfully notes to the examiner that there exist additional reasons which militate in favor of unobviousness.

**ADDITIONAL REASON OVERCOMING THE EXAMINER'S
POSITION REGARDING USC 103**

72. **Unexpected Results:** Up to now, insofar as the applicant is aware, the prior art cited by the examiner has virtually ignored how to activate isotopic fuel, which is loaded into a material. The device described within the above-entitled application and thus both superior, unsuggested, and unobvious.

**ADDITIONAL REASON OVERCOMING THE EXAMINER'S
POSITION REGARDING USC 103**

73. **Assumed Insolubility.** Up to now, many skilled in the art have thought, or have found, that both obtaining fusion of this type, and the specific problem solved by this invention, were insoluble. The failures of much prior art, including but not limited to those cited by the examiner, indicates that a solution of these problems was, therefore, not obvious. This general lack of an obvious solution is discussed in the above-entitled application.

74. In summary, the cited references cannot be combined in the manner suggested and the claimed features of the invention described in the above-entitled application are lacking in the cited references. The present invention is distinct from the prior art and other art. None of the references shows a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material as taught in the above-entitled patent application. Applicant submits that the above-recited novel features in the independent claims, and hence in all claims, provide new and unexpected results and hence should be considered unobvious, making the claims patentable under Section 103.

The Applicant has explained in detail (*supra*) how the cited art are different and therefore produce a different result from the present invention. Applicant has given lists of additional critical features and components which distinguish Applicant's invention to operatively function in a different manner to the cited art. Therefore, in accordance with the foregoing arguments, Applicant has fully conformed with the requirements of section 103 of the Patent Act; and further, that Claims 1, 5 through 8, 10 through 14, and 21 through 30 of the present invention clearly define patentable subject matter. These claims are patentable over the cited references because the claims recite novel structure and thus are distinguished physically over every reference [Sec. 102], and the physical distinctions effect new and unexpected results, thereby indicating that the physical distinction is simply not obvious [Sec. 103]. Given the above, reconsideration of the rejection of claims is respectfully requested.

RE: U.S.C.112 REJECTION

75. Claims 1-14 stand rejected under 35 U.S.C. 112 by the Examiner, based upon commented rebutted in detail below, and upon flawed reference to other art ("FP" or "F+P"), that he purports did not exist or was flawed thereby invalidating the applicant's independent work over more than a decade which has produced more than forty papers in peer-reviewed scientific journals.

The Applicant respectfully submits that the original specification, accompanied by the figures of said specification, clarify this matter to one skilled-in-the-art by providing a complete description of the invention.

Loading and Patterns of Failure


76. The Examiner states,

".... there is neither an adequate description nor enabling disclosure of how and in what manner such charging is achieved."

"There is neither an adequate description not enabling disclosure of the parameters of a specific operative embodiment of the invention, including atomic or weight ratio of metal electrodes to electrolyte (e.g. palladium to gel),"

The TRUTH - Loading Was Discussed And Is Understood

The Examiner inaccurately purports that *"there is neither an adequate description nor enabling disclosure of how and in what manner such charging is achieved"*. Charging is a synonym for loading as the Examiner is aware. Therefore, the statement is incorrect for several reasons which should be known to a PhD in Nuclear Science and Engineering or other professional skilled-in-the-art, additional references were cited. Furthermore, the Examiner inaccurately states there is no disclosure of *"atomic or weight ratio of metal electrodes to electrolyte (e.g. palladium to gel)"*. However, this, and the isotope ratios in the metal and loading, were discussed in the original specification [S.N. 07/760,970, confer also Swartz (97C)], and in the referred to Applications (for example '457 on page 16, lines 11-14), and in reference to the peer-reviewed articles [Swartz (1992), Swartz (1993), Swartz (1994)]. See Figure 1 from Applicant's peer review publication.



It is especially important to note that there has been insufficient mention of loading achieved in many of the so-called "negative results" studies upon which the Examiner relies. The proper loading required must usually be in excess of the values mentioned in Examiner's art [and not even mentioned in the majority of the papers which were cited by the Examiner]. Many "negative" results may be, in part, due to inadequate loading, and/or the failure to monitor said loading of isotopic fuel as shown in Figure 1 from the Applicant's peer-reviewed published paper, "Patterns of Failure..." (Swartz 98B).

77. The invention at issue in this case, generally speaking, uses a metal such as palladium which has the unique property of internally filling ("loading") with hydrogen, as a sponge fills with water. Loading of a material (palladium) with a hydrogen is neither unproven "theory" nor "incredible" as the Examiner falsely writes, but can be elicited using the teachings of Applicant's other specifications and claims, as cited. Applicant taught how to introduce fuel ["load"] as claimed. As Dr. Scott Chubb stated about the patent application of which this Application is a divisional, in his Amicus Brief,

"...each deuterium nucleus (D) may effectively dissociate from its electron and freely flow through the metallic substrate ... these nuclei ... are free to move throughout a crystal lattice"

78. Applicant has discussed loading in considerable detail in several cases before the Office, and these were even understood by the Federal Appellate Court. Applicant did refer to said applications and cases in the present application. Loading is discussed in each of the referred to patent applications of the Applicant, including '457 where it is discussed on page 16, lines 11-14. Specifically, in the '970 application, Applicant taught about loading on pages OS 15-16, 19, 20, 21, 22, 24, 27, 28, and 34 in the original specification. Confer also Swartz (1992), Swartz (1993), Swartz (1994). Applicant's loading technology, consistent with conventional physics, has been published in peer-reviewed journals [Swartz, M., Fusion Technology, 22, 2, 296-300, 1992; 26, 4T, 74-77, 1994; 32, 126-130, 1997; Hagelstein, Swartz, MIT RLE Progress Report, 139: 1, 1-13 (1997); Swartz, Fusion Technology, 31, 228-236 (1997); ICCF-4, (1994); J.New Energy, 1,4,26 (1997); M.Swartz, 1992, "Quasi-One-Dimensional Model of Electrochemical Loading of

Isotopic Fuel into a Metal", *Fusion Technology*, 22, 2, 296-300; Swartz, M., 1994, "Isotopic Fuel Loading Coupled To Reactions At An Electrode", *Fusion Technology*, 96, 4T, 74-77; "Codeposition Of Palladium And Deuterium", *Fusion Technology*, 32. 126-130 (1997); Swartz, 1994, "Generalized Isotopic Fuel Loading Equations", and "*Cold Fusion Source Book*", International Symposium On Cold Fusion And Advanced Energy Systems", Ed. H.Fox, Minsk, Belarus; Swartz, 1997]. These are proof and confirmation of Applicant's teachings and demonstrate and confirm enablement of those teachings, and relevant here, also demonstrates confirmation of the teachings taught years earlier in the original specification and claims of which the present application is a divisional.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

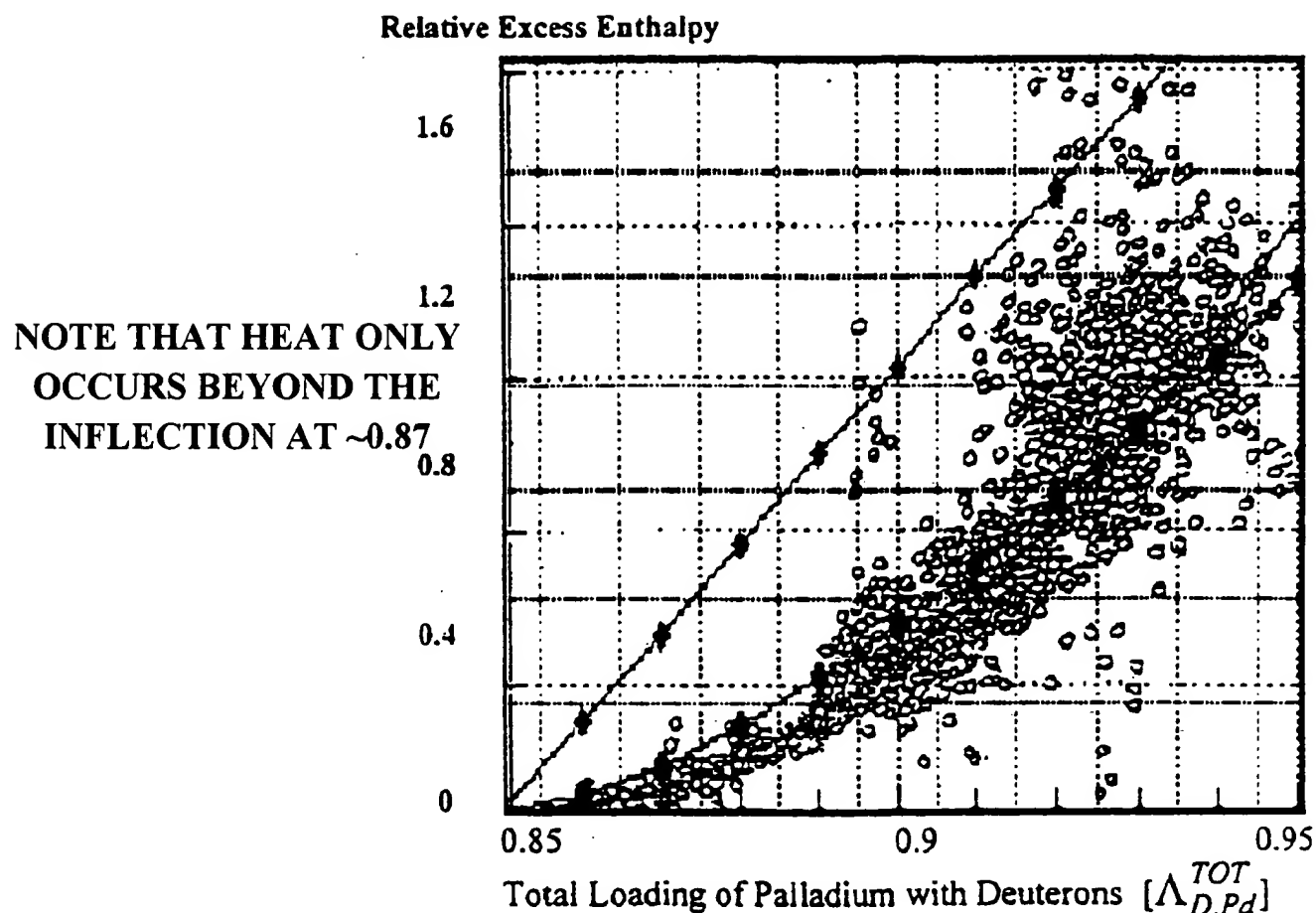


FIGURE 1 - IMPORTANCE OF LOADING AN ELECTRODE

This figure shows the increase in observed excess enthalpy (or heat, shown along vertical axis) from a palladium (Pd) electrode loaded with deuterons (D) from heavy water. Increased loading is towards the right hand side. The data [open symbols] show the excess heat as a function of loading, and are from an independent palladium-heavy water system [after M. McKubre (1993)]. This shows the importance of monitoring an electrode because the desired product (excess heat) only appear after loadings of ~ 0.85 D/Pd are achieved [the atomic ratio of 85 deuterons to 100 palladium (Pd) nuclei within the electrode]. Attention is directed not only to the fact that the desired reactions are zero below ~ 0.85 .

79. The Examiner states,

""On page 5, lines 9-10 of the specification, the applicant states that "there is a build-up of deuterons and a low dielectric constant in the near cathode solution." However, there is neither an adequate description nor enabling disclosure of how and in what manner-the deuteron build-up and low dielectric constant are achieved. The disclosure is also insufficient as to what actually is "low dielectric constant"."

The terms are generally known at the freshman level of electrochemistry. They are certainly familiar to anyone knowledgeable with the state of the art. The Examiner is referred to the following on electrochemistry and continuum electrodynamics, *sine qua non* to those skilled in the art.

Uhlig, H.H., "Corrosion and Corrosion Control", Wiley (1971).

Bockris, O'm, J., K.N. Reddy, "Modern Electrochemistry", Plenum Press (1970).

Von Hippel, A. "Dielectric Materials and Applications", MIT Press, (1954);

Von Hippel, A., D.B. Knoll, W.B. Westphal, "Transfer Of Protons Through 'Pure' ICE Ih Single Crystals", J. Chem. Phys., 54, 134, (also 145), (1971).

Melcher, J.R., "Continuum Electromechanics", MIT Press, Cambridge, (1981).

[Applicant notes that he was fortunate enough to have served in the Laboratory for Insulation Research at MIT for Dr. Arthur von Hippel and to have received three degrees in electrical engineering there for work including thesis work of which Dr. von Hippel was the Supervisor. Applicant studied under the late Dr. Jim Melcher and Herbert Uhlig for three and two years, respectively, at MIT; and is fortunate to now have Dr. Bockris as a colleague for several years in the field of which the present invention resides.]

As fully taught in the disclosure, and the patents which are referred to, the power source generates the applied electric field intensity. The induced drift by the applied electric field is shown schematically in the figure which does not mean that the deuterons travel in such a simple fashion. The electric field distribution is altered as the solution and system each respond with complex conduction and polarization phenomena. Ionic drift, secondary space charge polarization, propagation of solvated deuterons, deuterons in clathrates, and L-,D-deuteron defects with their ferroelectric inscription in the heavy water, and the formation low dielectric constant bubbles abutting the cathode are the minimum expected. The double layer between the solution and the metal is created both by the cathode fall of ions and other polarization reactions. The mechanisms of dielectric polarization

and conduction have been cited in the submitted applications by the applicant which are referred to in the present application. If any are omitted they are now added to this disclosure, to supplement the others.

Applicant thanks the Examiner for bringing this up. So that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification, along with citations to the reference.

80. The Examiner states,

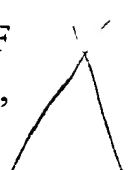
"There is neither an adequate description not enabling disclosure of the parameters of a specific operative embodiment of the invention, including... dimensional ratio of electrodes to their spacing (i.e., sizes of anode and cathode relative to the space between them),"

There is only one dimensional analysis which is relevant to this patent despite the Examiner's request for what appears to be a design patent. The correct dimensional analysis begins with the equation describing the quasi-1-dimensional model of loading. This offers insight into the processes because it indicates how both competitive gas evolving reactions at the metal electrode surface and the ratio of the applied electric field energy to thermal energy [$kB \cdot T$] are decisive in controlling the loading of the metal by the deuterium.

As Applicant taught, the loading flux [of the isotope of hydrogen into the cathode], must be distinguished both from the gas evolving flux, and even from the total current, as well (Swartz 1992).

"The three additional components of deuteron flux must be considered. The first is the entry of deuterons into the bulk of palladium which constituted the cathode. That flux is described as J_e , the rate at which deuterons physically enter the palladium cathode. The second deuteron flux is that component lost at the cathode to gas evolution ... (J_g)... J_f is the the flux of deuterons lost to fusion."

[Swartz, M., QUASI-ONE-DIMENSIONAL MODEL OF ELECTROCHEMICAL LOADING OF ISOTOPIC FUEL INTO A METAL, Fusion Technology, 296-300 (1992)]



The loading flux [of the isotope of hydrogen into the bulk volume of the palladium cathode] is fundamental to the entire understanding of these phenomena, and it was explicitly taught in the original specification. The loading flux must also be distinguished both from the gas evolving flux, and even from the total current, as well.

Assuming the Examiner is familiar with this, those skilled in the art understand that the applied electric field influences the spatial distribution of deuterons in aqueous solution. Without significant convection, the flux (J_i) of any i th species (here deuterons) results from diffusion down concentration gradients and electrophoretic drift.

$$J_D = -B_D * \frac{d[D(z,t)]}{dz} - \mu_D * [D(z,t)] * \frac{d\Phi}{dz} \quad (\text{eq.1})$$

For additional background, the Office is referred to Swartz, M., "Quasi-One-Dimensional Model Of Electrochemical Loading Of Isotopic Fuel Into A Metal", Fusion Technology, 296-300 (1992) Swartz, M., "Isotopic Fuel Loading Coupled To Reactions At An Electrode", ICCF-4 (1993); Swartz 97C, 97B. These equations are complex because they include the differential isotope diffusivity, electrophoretic mobility, solubilities and the range of susceptibilities of the materials and products involved, which have parameters and vary with temperature. Applicants writings, including the original specifications filed with the Patent Office go on with how the results of the mathematical expression concerning the deuteron flux into palladium relates to the applied electric field intensity.

The equation can be examined for its relation to thermal processes by substitution using additional non-dimensional parameters and the Einstein relation.

$$\frac{B_D}{\mu_D} = \frac{k_B * T}{q} \quad (\text{eq.2})$$

Coupled equations thus determine the distribution of deuteron species in the bulk solution. The mathematical solutions are determined both by the boundary conditions and by conservation of mass. The Q1D model indicates that the deuteron loading rate into the electrode is critically linked to gas evolution and is also first order on $\mu_D * E$. This loading rate equation (equation 3) relates deuteron availability (secondary to the applied electric field) to the losses of deuterons to both gas evolution and the fusion reactions.

$$\kappa_e = (\mu_D * E) - (\kappa_g + \kappa_{fus}) \quad \text{(equation 3)}$$

One simple but important corollary is that the evolution of D2 gas and deuteron loading to the palladium cathode are mutually exclusive for any given applied electric field. Another important corollary is that this **NOT ELECTROLYSIS**. As Applicant taught in Swartz(92), and Swartz (89), electrolysis is the opposite of what is desired. This differs from all other cited art.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now by reference to peer-reviewed publication in the specification.

81. The Examiner states,

"There is neither an adequate description not enabling disclosure of the parameters of a specific operative embodiment of the invention, including ...minimum concentration of the isotopic fuel in the cathode necessary for the desired reactions to take place,"

"..., there is neither an adequate description nor enabling disclosure of how and in what manner one would determine whether "full charging" has been achieved..."

THE TRUTH - Charging Of Palladium And Optimal Operating Points Understood

This is disingenuous for reasons cited above, and the following.

The Examiner inaccurately purports that the description of means to "minimum concentration of the isotopic fuel in the cathode necessary for the desired reactions to take place" and "manner one would determine whether "full charging" has been achieved" were inadequate.

These notions are utterly incorrect for several reasons. Applicant cites his publications and other applications. In '457 Applicant taught "increasing through a series of at least three incremental steps the electric power drive conditions of said electrical circuit" on page 15, lines 15-20, and page 23, lines 14-17. Furthermore, in '457 and in the corresponding figures in Swartz(97), there are graphs of the output [Figure 6, labels 701, 702] and the V-I (voltage current) characteristics [Figure 5, labels 503, 510, 519, 520, 504, 521].

In addition, many "negative" results the result of the failure to operate the system at the optimal operating point [Confer Figure 2].

Furthermore, in addition, to alleviate any possible additional problem which the Examiner might have, the Applicant has now amended this application to include again said references to said other applications, and to said peer-reviewed published papers.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

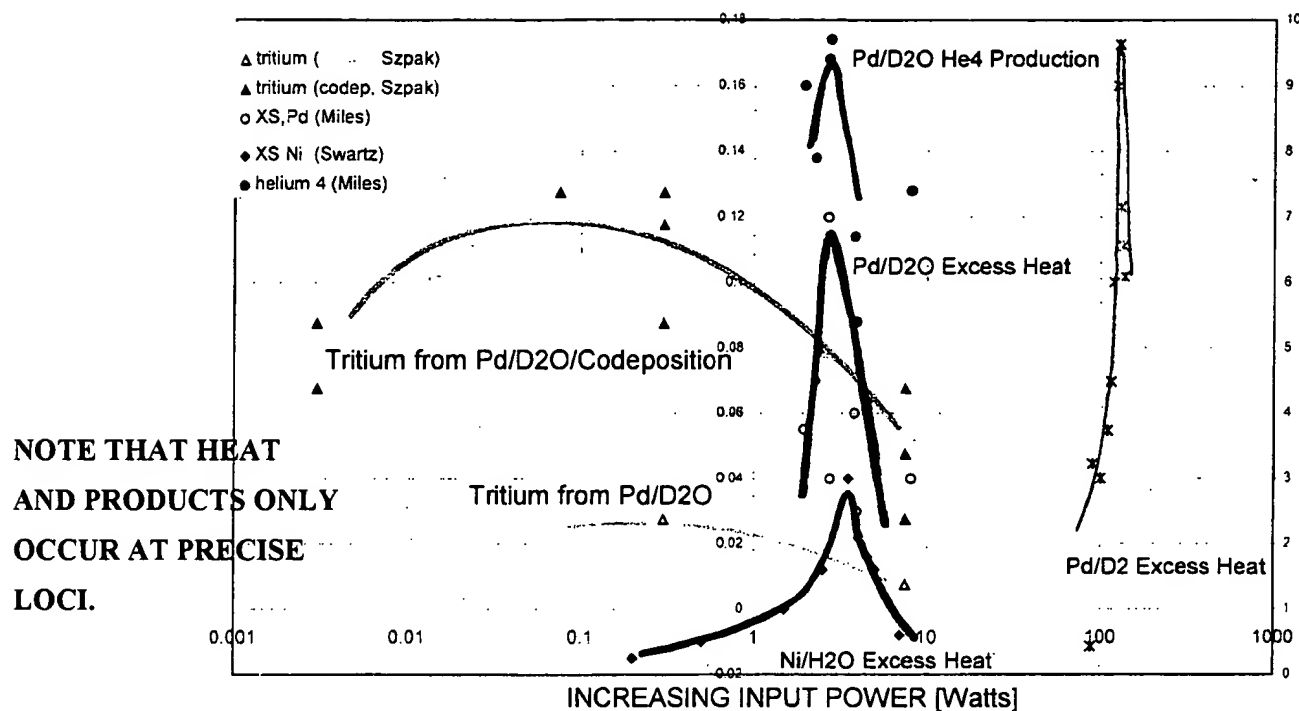


FIGURE 2 - OPTIMAL OPERATING POINTS

In addition to loading, "optimal operating points" must be understood to successfully use LENR/CF systems. This graph shows the biphasic response of the products (heat, helium-4, tritium) of these systems to increasing input electrical driving power. The horizontal axis represents the electrical input power and is logarithmic. The nickel light water data is from Swartz; the palladium heavy water data are from Miles (USN) and Szpak (USN). The data reveal relatively narrow loci of optimal operating points. Driving with electrical input power beyond the peaks (optimal operating points) does not help the production of the desired product but yields a falloff with increasing input power. Optimal operating points account for some of the widespread difficulties in observing these phenomena because of driving the systems inadvertently or unintentionally outside of the optimal operating point (Swartz. M., Journal New Energy, 4, 2, 218-228 (1999), Swartz. M., Transactions of the American Nuclear Association, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85); Swartz. M., G. Verner, A. Frank, H. Fox, Journal of New Energy, 4, 2, 215-217 (1999); Swartz. M., 1997, Fusion Technology, 31, 63-74).

82. The Examiner states,

"On the corrected paragraph ...on page 6, the applicant states "these devices contain a cathode (labelled 1), intradevice gel containing lithium and palladium deuterioxide (labelled 6), and anode (labelled 7) (sic)."

There is neither an adequate description not enabling disclosure of the ... the exact composition (including impurities and amounts thereof) of the electrolyte and of the cathode and of the anode, etc. "

TRUTH - Composition Of Electrodes And Solution And Materials And Barrers Were Given

This is inaccurate. Attention was also directed to Swartz (07/339,976; filed April 18, 1989, a specification pending before the Patent Office) and Swartz (07/371,937; filed June 27, 1989, specifications pending before the Patent Office, now as a Continuation). Swartz '457 also contains relevant information. Swartz patent applications and the other peer-reviewed references are now fully cited in the original above-entitled specification. Reference to other patents is allowable.

"An original specification can also incorporate by reference subject matter disclosed in another patent application which is pending before the Patent Office and hence unavailable to the public."

[In re JOLLES; United States Court of Customs and Patent Appeals, 1980, 628 F.2d, 1322, 206 USPQ 885]

Swartz (07/339,976) taught codeposition of palladium salts.

"the combination of palladium salts ... and the means to cathodically codeposit said materials directly onto a cathode.

[Swartz; US 07/39,976; April 18, 1989]

The parent of the above-entitled application goes even further and teaches the use of gels, the use a of coaxial- and cruciform-shaped anodes made of palladium, and other strategically configured systems. The present application, and also Swartz (1992), Fusion Technology) discuss the advantages of a dissolving palladium anode.

Swartz (07/339,976) teaches alloyed electrodes. However, only the above-entitled application teaches and discusses the multiple compartment cathodes, the novel composite cathodes, as well as novel peri-, and intracathodic structures.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of

applicant which are cited, said patents and references are now appended into the specification.

83. The Examiner states,

"On page 5, lines 4-6 of the specification, the applicant discloses a not shown power supply and control unit consisting of a current source and reactor control device. However, there is neither an adequate description of the elements that form said power supply and control unit nor enabling disclosure of how and in what manner the elements are interconnected for the claimed invention.

There is neither an adequate description not enabling disclosure of the parameters of a specific operative embodiment of the invention, including ... voltage and current requirements to produce the orthogonal electric fields and the magnetic field..."

TRUTH - Electrical Description Was Given

This is inaccurate. Attention was also directed to Swartz (07/339,976; filed April 18, 1989, a specification pending before the Patent Office) and Swartz (07/371,937; filed June 27, 1989, specifications pending before the Patent Office, now as a Continuation). Swartz '457 also contains relevant information. Swartz patent applications and the other peer-reviewed references are now fully cited in the original above-entitled specification. Reference to other patents is allowable.

"An original specification can also incorporate by reference subject matter disclosed in another patent application which is pending before the Patent Office and hence unavailable to the public."

[In re JOLLES; United States Court of Customs and Patent Appeals, 1980, 628 F.2d, 1322, 206 USPQ 885]

Swartz (07/339,976) taught the use of a current source. The FUSOR was the brand of power supply from JET Energy Technology [Wellesley, MA]. '457 and the cited papers gave full disclosure of voltage and current requirements. The voltage and current requirements are discussed in the original specifications to which the present application does refer, including in the referred-to Application ['457] on page 15, lines 15-20, therein, along with Figures 4, 5, 6 which show the voltage, and the electrical power and power gain (which are the more important engineering parameters); confer also Swartz (97A, 98A).

84. The Examiner states,

"On page 5, line 11 of the specification, the applicant states that "there may be spikes or on the cathode (sic)." However, there is neither an adequate description of what constitutes a "spike" nor enabling disclosure of how and in what manner this spike was produced and what effect, if any, does the spike have on the performance or integrity of the system."

This is not relevant because THIS application is a divisional of '970, and is different from that to which the Examiner does refer [S.N. 07/339,976].

"An original specification can also incorporate by reference subject matter disclosed in another patent application which is pending before the Patent Office and hence unavailable to the public."

[In re JOLLES; United States Court of Customs and Patent Appeals, 1980, 628 F.2d, 1322, 206 USPQ 885]

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, this material, cited in the other applications of applicant, are now appended into the specification.

85. The Examiner states,

"Hence the only possible "products" that can be formed in the disclosed and claimed method are nuclear fusion products. Indeed, such is even attested to by applicant's parent application S/N 07/760,970, as well as the two applications referred to on page 2 of the applicant's specification."

THE TRUTH - HEAT IS A PRODUCT

Actually heat is a product and in Applicant's patent application, this is taught, and aspects of its measurement, generation, and capture are further taught and claimed. This is confirmed by the Examiner who said, contradicting the above,

"Additionally, the specification on page 3, lines 1 and 2, and on page 7, top paragraph, refers to the generation of energy, specifically heat energy, by the desired reactions of the isotopic fuel (e.g., deuterium) in the loaded cathode metals. Said heat energy being directed out via heat pipes and thermal bus. This production of heat energy from the reactions among the deuterons in the loaded cathode has become known in the art as "excess heat."

86. The Examiner states,

"On page 6, lines 5-6, the applicant discloses that the "deuteron-impenetrable barrier(s) act to enhance the desired reactions... Also, there is neither an adequate description nor enabling disclosure of how and in what manner said desired reactions would be enhanced by the barriers that are impenetrable to deuterons."

"There is neither an adequate description nor enabling disclosure of how and in what manner, one can control the production of a product merely by: supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and applying the second electric field to redistribute said isotopic fuel (e.g. see claim 10). There is neither an adequate description nor enabling disclosure of how and in what manner, one can control the production of a product merely by: supplying said isotopic fuel to said material, loading said isotopic fuel into said material, and applying in combination two non-parallel applied electric fields"

THE TRUTH - DEUTERON IMPENETRABLE BARRIERS REFER TO DIFFERENT APPLICATION

As taught in the original specification, Applicant has described barriers which are used to strategically inhibit the flow of isotopic fuel (deuterons in palladium by boron, or protons in nickel by gold) (confer Appendix C which is in the file record, and included here again for reference, and the other cited references including the published peer-reviewed publication Swartz, 1998, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85; Swartz, 1997, "Biphasic Behavior in Thermal Electrolytic Generators Using Nickel Cathodes", *IECEC 1997 Proceedings*, #97009; Swartz, 1998.

The breadth of this subject requires an Appendix which is attached hereto and has been part of the file record of the '970. [A copy is given herein for the Examiner.] This introduction to the subject delineates many different barriers which can be divided into classes based upon characteristics discussed therein. There are a spectrum of "barriers" in this field. Some are structural, some are diffusive, some enable electrophoresis, some dielectrophoresis and its magnetic equivalent. Many are fully specified in the present inventions's original disclosure, many novel and unobvious from prior art. For example, in the preferred embodiment of said referred to application of which the present application is a Divisional, the cathode is

surrounded in coaxial fashion by a deuteron diffusion barrier (labelled 50 in figure 7) and an expansion barrier (labelled 40). The cathode is axially-fed the deuterons. As taught in the original specification of '970, in the preferred embodiment, this two-stage process is housed in a structural support system (labelled 20).] The full charging is discussed in detail in the referred to peer-reviewed publications including Swartz (92), Swartz (94), Swartz (97A), Swartz (98A), and Swartz (98B).

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references and said publications are now appended into the specification to eliminate any possible confusion.

87. The Examiner states,

"... on page 7, the applicant discloses that "the purpose of the receptor apparatus is first to integrate the three (or more) CAM reactor units." However, the terms "receptor apparatus" and "integrate" are vague and undefined. ..."

"On the corrected paragraph replacing the 3rd paragraph on page 6, the applicant discloses that the CAM devices are held in place by "clips". However, there is neither an adequate description of these clips nor enabling disclosure of how and in what manner said clips so hold said devices."

THE TRUTH - EXAMINER REFERS TO DIFFERENT APPLICATION

This is not relevant because THIS application is a divisional of '970, and is different from that to which the Examiner does refer [S.N. 09/579,381].

"An original specification can also incorporate by reference subject matter disclosed in another patent application which is pending before the Patent Office and hence unavailable to the public."

[In re JOLLES; United States Court of Customs and Patent Appeals, 1980, 628 F.2d, 1322, 206 USPQ 885]

The Examiner refers to S.N. 09/579,381 which teaches a method for integrating three (or more) reactors into a power and product grid with means to extract product, including heat, through the socket, and with means for using electrical and thermal connectors held in a mechanical connecting system, means including clips and sockets, means to allows replacement and coupling to the control system, means using conductive and insulating clips, means to extract the heat from

the reactor, means including heat pipes, diamond, or composites of diamond in thermally conductive epoxy filled with diamonds, means including a heat dissipative radiator, and means including separation of the anodes and anodic connectors from the cathodes and cathodic connectors. Simply put, '381 is an improvement for heat removal and integration of smaller units into larger assemblies. In the preferred embodiment, the apparatus described by the present application is a device shaped like a fuse and can be easily placed into, or removed from, an assembly. The damage or rundown of one unit "is thus easily exchangeable by replacement with a functioning one", which is re-inserted, as taught in the above-entitled application, into mechanical restraining, electrical, and thermal connectors (labelled 94, 96, and 97) and further restrained with clips (labelled 92).

The clips that can be used in these devices capable of integrating reactors involving a material loaded with hydrogen are well known to those who work in the art with the exception of the fact that in the present application there is the novel and nonobvious method of having product transfer taken place to the socket itself.

'381 involves product transfer through the socket itself. Thus, '381 teaches a method for integrating three (or more) reactors into a power and heat grid with means to extract product, with means for using electrical and thermal connectors held in a mechanical connecting system, means including clips and sockets, means to allows replacement and coupling to the control system, means using conductive and insulating clips, means to extract the heat from the reactor through the socket, means including heat pipes, diamond, or composites of diamond in thermally conductive epoxy filled with diamonds, means including a heat dissipative radiator, and means including separation of the anodes and anodic connectors from the cathodes and cathodic connectors.

Applicant thanks the Examiner for bringing this up, and so that there can be no question or confusion, and because this material is cited in the other applications of applicant which are cited, these references are now appended into the specification.

88. The Examiner states,

"There is neither an adequate description nor enabling disclosure of the purpose of the application of the magnetic field, nor of how and in what manner ..."

THE TRUTH - PUMPING ACTION BY A SPATIALLY INHOMOGENOUS MAGNETIC FIELD

'691 teaches an extraction procedure using a spatially inhomogeneous magnetic field intensity which has forces which goes as $(m H) * (m H)$, and not $(v \times m H)$ as taught in Salisbury, Hirsch and the other cited art.

As specified in the original disclosure: The pumping action upon products [other than heat] is from the action of an applied force exerted upon said product (in this case an isotope of hydrogen: tritium). The generation, and calculation, of the force induced by an applied magnetic field intensity upon the desired isotope which is generated within the CAM reactor, is derived as follows.

"An inhomogenous magnetic field intensity is applied by coil labelled 300 to one portion of the cathode (1). Said magnetic field is driven by the power supply (labelled 301) in the figure. The spatially inhomogenous magnetic field could also be created by a superconductor."

[07/760,970; the present application in Continuation; Underline added for emphasis]

Ampere's Law is used to calculate the line integral of the magnetic field intensity around the applied electric current. That magnetic field intensity exists mainly in the gap between the high permeability rod (around which the coil has been wound) and includes the volumes encompassing the desired isotope [cf. Figure 18 of the original specification].

"The differential magnetic susceptibility between isotopic fuel and the nuclear fusion product is used to magnetically pump the product to and through the barrier labelled 350. At that location there is a buildup of the isotope with the larger magnetic susceptibility due to said differential magnetic susceptibility."

[07/760,970; the present application in Continuation]

The magnetic field intensity can be derived by inspection in the gap region based upon Gauss' Law, which implies that the divergence of the magnetic flux density is zero. Therefore, the use of a volume with one surface abutting the volume containing the desired isotope and the other surface abutting the end of said rod, results in a ratio between the two magnetic fields.

The magnetic field as taught in the above-entitled application is spatially inhomogeneous. The important result, as stated in the original specification, is that energy of the entire system decreases by the movement of the higher susceptibility isotopes towards, and into, the region containing the greatest magnetic field intensity.

89. The magnetic force, resulting from the applied magnetic field, is the spatial derivative of the magnetic coenergy with respect to distance.

"The magnetic force resulting from the applied magnetic field is the derivative of the magnetic coenergy with respect to distance in the axial direction, and is proportional to the square of the current, the square of the number of turns in the coil (300), and said differential magnetic susceptibility. The products are removed at the product barrier (labelled 350). If said isotopic product is of lower magnetic susceptibility, then the coil is moved toward the portion of the cathode near to the solution (6)."

[07/760,970; the present application in Continuation]

As an alternative means of calculating the applied magnetic force upon the desired isotope is to use the Maxwell Stress Tensor. The Maxwell Stress Tensor is based upon the orthogonal, and parallel, components of the magnetic field intensity over the surface of the desired isotope. The stress tensor is quite complex. The calculated force is based upon the spatial divergence of the stress tensor. Both methods of deriving the magnetic force are identical. These solutions are extremely complex but an introduction to this physics in a far simpler system [as regards ferrofluids and not the more complicated invention and products of the above-entitled application] is available in "Electromechanical Dynamics", Part III, Elastic and Fluid Media, H. Woodson, J. Melcher, J. Wiley & Sons, Inc., NY (1968), pages 772 to 777 [cf. figures 12.2.21 and 12.2.24].

The equations of the above-entitled application are more complex because they include the differential isotope solubilities, the range of susceptibilities of the materials and products involved, which have parameters which vary with temperature. The present invention goes much further than either, or other cited art, with claims that clearly distinguish the invention.

THE SKILLED-IN-THE-ART SUPPORT APPLICANT

90. To rebut the Examiner, the Applicant hereby submits several Declarations by those skilled-in-the-art. The Declarations substantially and fully address all matters and issues criticized by the Examiner, and contain averments regarding evidence establishing the utility, validation, and operability of the Applicant's claimed subject matter. These include the Straus (4/22/94), Swartz, and other Declarations, including but not limited to the Amicus Curiae Briefs of Edmund Storms (2/21/01), Talbot Chubb (2/221/01), Eugene Mallove (3/24/00) and Hal Fox (2/21/01). Said Declarations are hereby accompanied by statements supporting their introduction including full and explicit showing of good and sufficient reasons why they were not presented earlier (including that they are already in the preceding file folder).

91. The Declarations contain factual statements directly addressing how the specification adequately described the subject matter recited in the claims.

The Declarations prove that the Applicant taught in the original specification and claims how his apparatus works and claimed the invention.

The Declarations demonstrate that a person of ordinary skill in the art would have understood the inventor to have been in possession of the claimed invention at the time of filing.

The Declarations demonstrate that the invention operates as stated, and as explicitly taught in the original specification and claims.

92. Validation occurs when scientists actually skilled, and working, in the state-of-the-art state it to be so. Said scientists write the scientific technical papers which undergo peer-review, file the patents applications, and attend international conferences (which have gone on for 13 years -- and they disagree with the Examiner. Therefore, the Examiner must not err by failing to consider those skilled-in-the-art who counter the rejection under 35 U.S.C. §112 and §101 because the Declarations demonstrate utility and operability as taught in the original specification and claims.

Peer-Reviewed Publications Prove Enablement

93. The present invention involves a method which includes in combination loading isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material.

Supporting utility and operability and demonstrating enablement of the present invention, the Applicant submits (and has previously submitted) his publications involving the present invention, which have been published in the peer-reviewed hot fusion journal of the American Nuclear Society [including Swartz, 1998, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85 and Swartz. M., 1997, *Fusion Technology*, 31, 63-74, hereafter "Swartz(97)"]. Swartz(97) [*Fusion Technology*, 31, 63-74, 1997], proves utility and operability and demonstrate enablement for a person with ordinary skill-in-the-art. These papers, including Swartz(97) and the other publications, are submitted again, and are listed on Forms 1440. The Applicant has assumed that they were already in the record, but are now again necessary because of the misstatements by the Examiner. Swartz (98) and Swartz(97) and the other peer-reviewed publications demonstrate that the invention was correctly taught in the original specification and claims on the filing date of the application [validation].

94. Applicant's publications in peer-reviewed journals have taught the desired reactions and system operation [Swartz, M., "Generality of Optimal Operating Point Behavior in Low Energy Nuclear Systems", *Journal of New Energy*, 4, 2, 218-228 (1999); Swartz, *et alia*, "Importance of Non-dimensional Numbers and Optimal Operating Points in Cold Fusion", *Journal of New Energy*, 4, 2, 215-217 (1999); Swartz, 1997, "Consistency of the Biphasic Nature of Excess Enthalpy in Solid State Anomalous Phenomena with the Quasi-1-Dimensional Model of Isotope Loading into a Material", *Fusion Technology*, 31, 63-74; Swartz, 1998, "Optimal Operating Point Characteristics of Nickel Light Water Experiments", *Proceedings of ICCF-7*"; "Codeposition Of Palladium And Deuterium", *ibid*; Swartz, 1998,

Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85; Swartz, 1997, "Biphasic Behavior in Thermal Electrolytic Generators Using Nickel Cathodes", *IECEC 1997 Proceedings*, #97009; Swartz, 1998].

95. Furthermore, Applicant's publications in peer-reviewed journals have taught standards and quality control ("Q/C") which are relevant to experimental operability ["Patterns of Failure in Cold Fusion Experiments, Proceedings of the 33RD Intersociety Engineering Conference on Energy Conversion, IECEC-98-I229, Colorado Springs, CO, 1998; Swartz, M, 1997, "Noise Measurement in cold fusion systems, *Journal of New Energy*, 2, 2, 56-61; Swartz, 1996, "A Method To Improve Algorithms Used To Detect Steady State Excess Enthalpy", *Transactions of Fusion Technology*, 26, 156-159; Swartz, 1993, "Some Lessons from Optical Examination of the PFC Phase-II Calorimetric Curves", 2, Proceedings: "Fourth International Conference on Cold Fusion", 19-1, *op. cit.*; Swartz, 1996, "Relative Impact of Thermal Stratification of the Air Surrounding a Calorimeter", *Journal of New Energy*, 2, 219-221 (1996); Swartz, 1996, "Improved Calculations Involving Energy Release Using a Buoyancy Transport Correction", *Journal of New Energy*, 1, 3, 219-221; Swartz, 1996, "Potential for Positional Variation in Flow Calorimetric Systems", *Journal of New Energy*, 1, 126-130; Swartz, 1997; Swartz, 1996, "Definitions Of Power Amplification Factor", *J New Energy*, 2, 54-59, and Swartz, 1997, "Explanations for Some Differences Between Reports of Excess Heat in Solid State Fusion Experiments", *J New Energy*, 2, 1, 60-65].

96. Applicant's publications in peer-reviewed journals are evidence demonstrating that he has correctly taught operability and enablement [Swartz. M., 1994 "Catastrophic Active Medium Hypothesis of Cold Fusion", Vol. 4. "Proceedings: "Fourth International Conference on Cold Fusion", sponsored by EPRI and the Office of Naval Research, and Swartz, M., 1997, "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", *Journal of New Energy*, 1, 4, 26-33, but also Swartz, M, 1998, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting,

(ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85]. These prove utility and operability (a question of fact).

97. Applicant's publications in peer-reviewed journals confirm operability as taught years earlier in the original specification and claims. Attention is directed to the fact that Applicant's publications in peer-reviewed journals are NOT press releases unlike those whom the Examiner cites as segue to bring in other much less relevant art. Applicant's publications are peer-reviewed and therefore they demonstrate validation, utility, operability, and enablement as taught in the above-entitled original specification and claims. Therefore, enablement has been shown both by the Declarations and by said peer-reviewed publications.

LAW

98. These publications prove Applicant was correct on the filing date of the application [In re Hogan, 559 F.2d 595, 60S, 194 USPQ 527, 537 (CCPA 1977)].

The original specification and claims of the present invention also taught and claimed a process loading an isotopic fuel into a material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21].

99. The Examiner states,
"cold fusion" ... publicly announced by Fleischmann and Pons (hereinafter referred to as "F and P") on March 23, 1989... is still no more than just an unproven concept."

TRUTH - The Examiner's Argument Is Cut From Cloth Other Than This Application

The Examiner deviates from the present invention and refers to other art, far from the original specification and claims. Such handwaving to other much less relevant art is not a fair rebuttal, but is a different issue cut of a cloth not even made from the original specification and claims. Enablement, on the other hand, must be judged on this original specification and claims.

This invention is a method which includes in combination loading an isotopic fuel into a material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities.

The present invention is useful, as described in the original specification, including for devices which involve loading of metals by hydrogen, as stated in the specification, and corroborated in the Declarations by those skilled-in-the-art. This diversity of use is consistent with the directive of the court [In re Swartz 00-1107 and In re Swartz 00-1108].

It is only by calling the present invention "cold fusion", instead of a method which includes in combination loading an isotopic fuel into a material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities, that the Examiner can purport that the heat measurement is "unattainable" and continue the Examiner's unfounded attack on the Applicant with

his deliberate misreading of specification and claims as his segue to much less relevant art attacking "FP" (for Drs. Fleischmann and Pons).

The present invention is not the work of Pons/Fleischmann or their purported subject matter. Therefore, the Examiner's continual referral to other much less relevant art (FP) is not a rebuttal of this invention, but is neither proper nor fair because it is a further prejudicial attack against the Applicant. By contrast, the present invention involves a method which includes in combination loading an isotopic fuel into a material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities.^t The present invention does not involved the issues that the Examiner states. However, many of these issues have been discussed in the applicant's peer review published papers, and in the applicant's other patent applications. In order to fully comply, the applicant has amended the present application to refer to the published literature, peer review by the American nuclear society's "fusion technology", which preceded the present application. These references demonstrate that there isn't enabling disclosure by the applicant, and that has undergone peer review by members of the American Nuclear Society and by the United States Navy.

In fact, if the Examiner must rely upon reference to art cut of a cloth other than this specification and claims, then his position must indeed be quite weak.

100. Given the extensive "positive" published results which confirm the generation of products (including excess enthalpy) using isotopic fuel loaded into a material, the applicant therefore respectfully requests that the Examiner reconsider the rejection.

The Examiner should examine the three (3) videos which Applicant sent [CBC (1993), CBC (1994); BBC (1994)] to the file folder, of which this application is a Divisional. Said videos rebut the Examiner.

The Examiner should examine the ~300 published scientific articles which Applicant sent [over 140 pounds of Exhibits] including over 30 of the Applicant's

own peer-reviewed papers (several published by the American Nuclear Society, Fusion Technology) which were submitted. Important publications included Swartz(92), Swartz(94A), Swartz (97A) and Swartz(99), but also Mallove pp246-248, Storms(90,93); Arata(90); Celani(90); Pons(90); Bockris(90); Szpak(91B); McKubre(91); Will(91,93,94), Miles(94C,91,93B,94C); and McKubre, SRI ["Summary During ICCF-7", Infinite Energy, 4, 20, pp.34-35, (1998)]. The Exhibits are in the file folder of which this application is a Divisional. Instead, the Examiner relies on its rebutted "reports" from "science" reporters and those competing for Federal funds, all of whom do not even refer to the present invention. Nor have they been sworn in, or have been proven to be an expert, as the Applicant has done with his Declarants, and as the Applicant again requests of the Examiner, if he continues to rely on them.

101. The Applicant has already made comprehensive discussion of the errors in the Office by its reliance on Lewis, Huizenga, Jones, Morrison, Miller, etc. was made with solid substantive response. Discussion of the errors in Albagli was made with solid substantive response, including in the Federal Appellate Court [regarding '457 in the Appendix therein at A203-204,A244,A278-A279,A3553-355,A367-A370,A391, and especially A368]. Discussion of the errors in Cooke was made with solid substantive response, including in this Court [A208,A389-391]. Discussion of the errors in Huizenga was made with solid substantive response [A206,A243,A275-276,A279,A294-295]. Discussion of the errors in Jones was made with solid substantive response [A205,A251-A252,A291-292,A322; also A65,A70]. Discussion of the errors in Miller, a new argument by the Office before the Board, was made with solid substantive response [A316-317,A321]. Discussion of the errors in Morrison was made with solid substantive response [A252-253,A292-A293,A323].

102. Ziegler, Faller, Salamon, and Cooke report negative results, while looking for neutrons. Attention is directed to the fact that Faller did report a tritium increase. Other actually "positive" evidence in the Examiner's art which does support the existence of these reactions From 1989, Shani monitored stimulated neutron radiation from deuterated materials after being neutron-irradiated. However, fusion of isotopic fuel in a material does not usually produce significant

numbers of neutrons external to said material. Therefore these so-called putative "negative" results do not negate anything at all. In addition, not all of the art cited by the examiner was "negative" with respect to neutrons. Within the papers cited by the examiner, Shani did in fact monitor stimulated neutron radiation from deuterated materials after said deuterated materials were neutron-irradiated.

103. Some of the relied upon references cited by the Examiner are, or quote, "negative" results [eg. Browne, Lewis, Miskelly, Hilts - for example] which have been contested. Attention is drawn to the fact that most of the periodicals and newspapers cited by the examiner involve merely quoting the so-called "negative results" of others, either the Massachusetts Institute of Technology [MIT] (eg. Hilts) or Lewis et alia (Hilts, Browne). Given that the reference articles may be flawed, the additional tabloids referring to such obviously must be weighed accordingly, and are more than balanced by Bishop, Pollack, Schlesinger, Port, Chandler, and Freedman.

The Examiner continues to quote altered data in Albagli, but fail to cite, or explain the basis for ignoring, Applicant's evidence which was timely and repeatedly submitted [e.g. in the Federal Appellate case regarding '457 in the Appendix therein at A203-204, A244, A278-A279, A3553-355, A367-A370, A391, and especially A368]. The Office communication thus has disingenuous false statements and citations known to be false a priori by the Office [Niehot'f v. Sahagian, 103 A.2d 211 (Me. 1954)] and is therefore a breach of duty [Rannard v. Lockheed Aircraft Corp., 26 Cal. 2d 149 (1945), 18 U.S.C. §1503]. The Office communication is thus in error [People v. Pierce, 66 Cal. 2d 53 (1967); U.S.v. Price, 86 S. Ct. 1152, 1157, footnote 7; Sawtelle v. Farrell, 70 F.3d 1381, 1387 (1st Cir. 1995); Leasco Data Processing Equip. Corp. v. Maxwell, 468 F.2d 1326 (2d Cir. 1972); Pizarro v. Hotels Concorde Int'l, C.A., 907 F.2d 1256 (1st Cir. 1990); Peckham v. Continental Casualty Ins. Co., 895 F.2d 830, 836 (1st Cir. 1990); Donatelli v. National Hockey League, 893 F.2 459, 465 (1st Cir. 1990)].

104. The post-April 1990 literature supports the "existence" of the "cold fusion" effect(s). Much peer-reviewed, and other, art is available in Fusion Technology, Fusion Facts, and other journals. These, and Swartz, 1998, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998

Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85, dispute the Office. The chief product of the cold fusion reaction(s) is excess heat, but other released particles have also been reported {including tritium [Srinivasan, Current Science, 143 (1991); Storms, Fusion Technology, 17, 680 (1990)], sparse neutrons [Gozzi, J. Fusion Energy, 9, 241 (1990); Menlove, J. Fusion Energy, 9, 495 (1990)], helium-4 [Bush, J. Electro. Chem., 304, 271 (1991)], and possibly heavy elements [Matsumoto, Fusion Technology, 20, 323 (1991)]}.

Can the Examiner read all 9 volumes of the *Cold Fusion Times* and honestly state that the field does not exist?

105. In an attempt to support the unfair rejection, the Examiner cites other art including very less relevant experimental and theoretical papers, and also some columns from periodicals and newspapers. Of said art, most are from 1989. Close examination of said art reveals that all of said cited art appears to be dated before 1991. Thus, and as demonstrated below, the papers cited by the Examiner are functionally "old" and out-of-date.

The applicant respectfully notes that there are many problems with reliance upon newspapers. First, examples of the failure of "headlines" to be fair representative appraisals of new technology include the following:

"... after a few more flashes in the pan, we shall hear very little more of Edison or his electric lamp. Every claim he makes has been tested and proved impracticable."

[New York Times, January 16, 1880]

Second, the paper [from 1989] cited {Stiff} reported possibly negative results in the Wall Street Journal. However recent issues from the very same Journal now report positive results (cf. Bishop). In the New York Times there has been a similar shift in position. The issue of November 17, 1992 {Pollack} demonstrates the reported positive results. See also Freedman (in Science), Dagani (Chemical and Engineering News), Chandler (Boston Globe), Schlesinger, Port, as well.

106. The papers cited by the Examiner are functionally "old" and out-of-date. Even the very newspapers which the Examiner has cited now publish updates which herald that there is increasing acceptance of, interest in, and growth of this field [cf.

Freedman (Science 4/24/92), Chandler (Boston Globe 4/17/92)]. As a result, it is reported that scientists are "quite convinced that there is a source of heat" [Prof. Philip Morrison as reported in Chandler] and are "not concerned about the lack of neutrons (expected in a conventional) fusion reaction" [Prof. Louis Smullin as reported in Freedman]. Dagani (1992) now reports that growing numbers of the scientific community do take seriously the "excess heat". See also Chandler, Freedman, Bishop.

107. Several of the papers cited by the examiner are theoretical. Some of these "negative theoretical" citations calculate, using what may be incorrect or false assumptions and approximations, that fusion of isotopic fuel in a material, ie. cold fusion, can not "work" (eg. Ohashi, Cribier, Chapline). The applicant respectfully asks the examiner to reconsider, because in actual fact such calculations were historically presented "proving" that heavier-than-air ships (ie. airplanes) "cannot fly".

As another example: such calculations only created a virtual "drag" to the innovation of ideas, and their development and implementation, involving airships - which later evolved to include jets and spacecraft.

"Professor Goddard ... does not know the relation of action to reaction ... he only seems to lack the knowledge ladled out daily in our high schools"

[New York Times, January 13, 1920]

108. The Examiner is directed to the Office's citation of the NCFI report, and attention is now closely drawn to comments therein.

"Cold fusion work continues in many countries ... The occurrence of nuclear reactions in deuterium-loaded solids, such as palladium and titanium can no longer be reasonably denied. ... Several government laboratories are continuing their work on cold fusion, among them most notably are Los Alamos National Laboratories, The Naval Research Laboratory, The Naval Underwater Systems Command and The Naval Weapons Center. Significant positive results have been obtained in each of these laboratories. ... Over 100 groups from more than 12 countries have now reported on various types of evidence for the occurrence of nuclear reactions in deuterium-loaded metals or compounds."

[F. Will; Final Report National Cold Fusion Inst. (1991)]

NCFI efforts in-house in fact did support the existence of, and significant investment in, the "cold fusion" phenomena. The NCFI Report documented widespread examination of these phenomena.

Today, one of the most interesting papers in this field is from Mitsubishi delivered in China to the 9th International Cold Fusion meeting 4/02. The US is now 13 years behind other countries because of the US Patent Office denies allowing valid patent ignoring both Constitutional and Congressional directive.

LAW

109. Ignored in the Examiner's Communication are the following standards of review.

The Examiner ignores *In re Prater*, 415 F.2d 1393, 162 USPQ 541 (CCPA 1969)] which requires the Examiner to refer to the claimed invention as the focus of its Office communication, but it did not when drifting toward criticism of "FP".

The Examiner ignores *In re Morris* which requires that the Examiner must respond to what Applicant meant, but he did not.

The Examiner ignores *In re Hogan* [559 F.2d 595, 60S, 194 USPQ 527, 537 (CCPA 1977)] which discusses that enablement must be judged on the original specification and claims, but in this Communication it was not.

The Examiner ignores *In re Fouche* [439 F.2d 1237, 1243, 169 USPQ 429, 434, (CCPA 1971) and *In re Zletz* [893 F.2d 319, 13 USPQ2d 1320 (Fed. Cir. 1989)] which state that an invention (in structure, operation and composition) is defined by the claims and the original specification. This invention is a two-stage process involving loading of hydrogen into a metal electrode such as palladium, including a first stage of electrode loading, followed by, a second stage of sudden rapid ('catastrophic') flow of the loaded hydrogen within the metal and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities.

The Examiner ignores Rule 132 which requires Applicant's solid, substantial, and timely, evidence submitted against the Examiner's rejections be considered because "(p)atentability is determined on the totality of the record, by a preponderance of the evidence with due consideration to persuasiveness of argument." [Id. at 1445, 24 USPQ2d at 1444]. Applicant has published his inventions, proving that this invention was correctly taught in the original specification and claims, on the filing date of the application.

The Examiner ignores In re Gazave, 54 CCPA 1524, 379 F.2d 973, 154 USPQ 92 (1967)] and In re Chilowsky [43 CCPA 775, 229 F.2d 457, 108 USPQ 321 (1956)] which require consideration of the material which Applicant supplied and cited.

The Examiner ignores In re Oetiker, 977 F.2d at 1445, 24 USPQ2d at 1444 which requires the Examiner to substantively respond with a *prima facie* case of unpatentability. However, after the submission of Swartz, 1998, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85 and Swartz(97), other peer-review papers, and the Declarations, the burden shifts back to the Office and can only be discharged by the Examiner "presenting evidence or reasons why persons skilled-in-the-art would not recognize in the disclosure a description of the invention defined by the claims" [Wertheim, 541 F.2d at 263, 191 USPQ at 97]. Applicant asks that this be done with specificity, substantivity, and with explicit reference, and in detail with full findings of fact.

The Examiner ignores In re Brana and In re Eltgroth, 419 F.2d 918, 164 USPQ 221 (CCPA 1970) which demand that the Examiner must establish a reason to doubt an invention's asserted utility, and the loading of an isotopic fuel into a material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material and means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21] is not 'incredible' or

'unbelievable' like the Examiner appears to purport. This invention is quite believable.

110. In summary, Examiner must consider the submitted evidence including:

#1) Declarations from scientists of ordinary skill-in-the-art, who considered the specification and stated that the written description was sufficient.

#2) The published peer-reviewed scientific articles [including Swartz, 1998, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85 and Swartz(92, 94A, 97A, 97C)].

The Examiner ignores In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988) which indicates that #1 or #2 are sufficient to demonstrate that the specification provides an adequately written description of the subject matter, including how to operate the invention, and claimed the invention so that an artisan, or those skilled-in-the-art, could practice it without undue experimentation. Either #1 or #2 prove that enablement, utility, and validation. Together, #1 and #2 have been submitted and Applicant submits that these together corroborate enablement of the present invention both *de facto* and *de jure*.

111. The Examiner has failed to comment on the fact that energy is a Major Financial Sector of the US economy, and even more important during War. The Examiner cannot honestly admit there is no utility for an invention measuring energy-production and efficiency.

The Examiner ignores In re Vaeck [947 F.2d 488, 495-96, 10 USPQ2d 1438, 1444 (Fed. Cir. 1991)] which states that an enablement rejection under section 112, ¶1 is only appropriate where the written description fails to teach those skilled-in-the-art, like the Declarants, to make and use the invention.

The Examiner has ignored controlling authorities including Clause 8 of Section 8, Article I, by improperly eliminating an entire field involving energy and United States security.

The Examiner has ignored controlling authorities including Article VI, by interfering laws passed by Congress [DIAMOND v. CHAKRABARTY; 447 U.S. 303, 309] including that patentable statutory subject matter spans "anything under the sun that is made by man" [S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952); H. R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952)].

The Examiner has ignored controlling authorities including Article I, Section 2, by ignoring that Applicant is entitled to the privileges and immunities of citizens in the other states. Specifically, the Examiner ignores that the Office, Europe and Japan have allowed selected other patents in the very same field not allowed here [Czirr(5,231,290), Westphal(5,215,631), Ahern(5,411,654), Patterson(5,036,031), (5,318,675), (5,372,688), (5,036,031); Aspden, UK-GB 2,231,195B]. This is a dual-tiered system.

112. In addition, no such demand was made of the cited patents. There appear to be two different standards of review. Therefore, the Examiner has ignored controlling authorities including the reasoning of the Supreme Court in *United States v. Nixon* (1974) that all are "equal under the law". Hence, the Examiner has ignored controlling authorities including the 14th Amendment, requiring an impartial tribunal [28 U.S. Code Section 144, *Mayberry v. Penna.*, 91 S.8.; *Bloom v. Illinois*, 88 Ct. 499 S.Ct. 1477; *Duncan v. Louisiana*, 88 S.Ct.1444] and equal protection. In the light of the previously un rebutted Declarations [hereby again submitted] there appear to be violations of the 14th Amendment's "equal protection" clause [*Frontiero v. Richardson*, 93 S.Ct. 1736, 411 U.S. 677; *Weiss v. Weiss*, 436 N.Y.S. 2d. 862, 52 N.Y. 2d. 170 (1981)] with serious implications [*Gass v. Lopez*, 95 S. Ct 729; *Wood v. Strickland*, 95 S Ct 9S2; *U.S. v. Price*, 86 S Ct 1152, 1157, Footnote 7; *Griffin v. Breckenridge*, 91 S Ct 179D; *Gamez v. Toledo*, 42 U.S.C.§1983, and *Bivens v. Six Unknown Named Agents of Fed. Bureau of Narcotics*].

SUMMARY RE: 35 USC 112

113. The Applicant taught the subject matter defined by each of the rejected Claims including how his apparatus and method works, set forth the best mode contemplated, distinctly pointed out and claimed the subject matter which constitutes the invention, wrote an adequate enabling disclosure, and thus complied and conformed with 35U.S.C. §112, first paragraph, of the Patent Act.

Furthermore, a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material was presented in the original specification and claims so that an artisan, or those skilled in the art, could practice it without undue experimentation [In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988), citing with approval Ex parte Forman, 230 USPQ 546, 547 (Bd. Pat. App. & Int. 1986)]. Applicant has now demonstrated that his invention as claimed was, and is, adequately described to one skilled-in-the-art. Said Declarations are sufficient in their factual content with respect to the significant evidence, and prove that the Examiner is in clear error. By submitting said peer-reviewed publications, showing the Applicant is correct, and said Declarations containing relevant facts by probative witnesses, the Applicant has now undertaken the full burden coming forward with his evidence as required [In re Oetiker, 977 F.2d at 1445, 24 USPQ2d at 1444].

The Claims clearly define subject matter of considerable utility because energy needs dominate the economy.

The Examiner's communication contains copious material misstatements, including those corrected by the Office's own witnesses.

The Examiner's communication ignores the standards of review and the Office's own rules.

The Examiner's communication has not discussed the invention as it was actually taught, but is cut of a cloth other than this invention which demonstrates that the Office's notions are quite weak, heralding the need for allowance of the present invention.

The Examiner should closely consider and accept the testimony of the Declarants, skilled-in-the-art, who dispute the Examiner and attest to conformation with 35U.S.C. §101.

The Examiner should closely consider Swartz, 1998, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, *Transactions of the American Nuclear Association*, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85 and Swartz(97) and the other relevant peer-reviewed publications which demonstrate enablement at the time of the initial filing because validation only comes through peer-review.

In accordance with the foregoing arguments that Applicant has conformed with the requirements of sections 112 of the Patent Act, and reversal of the rejection of the Claims 1, 5 through 8, 10 through 14, and 21 through 30 is respectfully requested, as required by the statute (35 USC 112).

DISCUSSION OF 35 USC 101 REJECTION

114. Claims 1-14 are rejected under 35 U.S.C. 101 because the claimed invention as disclosed, in the erroneous opinion of the Office, is inoperative and therefore lacks utility. Applicant disputes this for the reasons below which are supported by facts and Declarants and peer-reviewed published papers.

The Office states,

"Claims 1-14 are rejected under 35 U.S.C.101 because the claimed invention as disclosed is inoperative and therefore lacks utility. ... There is no reputable evidence of record to indicate the invention has been reduced to the point of providing in current available form, an operative cold fusion system."

THE TRUTH - THOSE SKILLED-IN-THE-ART SAY THERE IS UTILITY

Proof of utility should be judged either by those using the invention or those skilled in the art. Therefore, the Examiner must consider those skilled-in-the-art who oppose and counter the rejection under 35U.S.C.§101. The Examiner points to out art not involving this Application. However, validation occurs when scientists actually skilled, and working, in the state-of-the-art state it to be so. These scientists write the current scientific technical papers which undergo peer-review, file patent applications, and attend international conferences (which have gone on for thirteen years) and they absolutely disagree with the Examiner.

DECLARATIONS AND OTHER TESTIMONY SUPPORT UTILITY

115. The Examiner is incorrect and absolutely and substantively contradicted Drs. Chubb, Fox, Mallove, McKubre, and by the Office's own previous witnesses, Dr. Rehn and Dr. Will.

At the seventh international meeting in this field. Dr. McKubre stated:

"For me, the best heat report, and perhaps the best report at this conference, was that of Mitch Swartz. ... I have not been able to perform the experiments myself, successfully, and I have always felt that the quality of the calorimetric observations in the nickel light water studies has been less than the quality of the calorimetric observations in the palladium-detuerium system. ... Mitch Swartz presented a very clear piece of calorimetric evidence which is cerainly going to cause me to reconsider my belief and understanding of the nickel-light water system and its capacity to produce anomalous heat"

[Dr. Michael McKubre, SRI, *Infinite Energy*, 4, 20 , pp.34-35, (1998)]

Dr. Michael Schaffer (A55, 8/7/01) said, "I do not see how anyone could construe anything that I wrote at Scientific American's site to imply that there is "no utility" in cold fusion, much less in instruments that might be used in cold fusion and other scientific experiments. ... As an expert ... I would agree [Dr. Swartz's invention] ... does have utility".

Dr. Rehn, U.S. Navy, said "Perhaps the clearest scientific fact, at this time, is the hardest for physicists to accept: nuclear reactions apparently do occur in deuterium-loaded Pd, Ti, and probably in other solids." [Office of Naval Research Asian Office, NAVSO P-3580, Vol. 18, Jan. 1993]. This confirms that Dr. Will said, "Significant positive results have been obtained (by) 100 groups from more than 12 countries" [Final Report NCFI (1991)].

116. Utility is a fact question, and proof of utility is sufficient if it meets at least one stated objective. Here it does. The Examiner has not followed the standards of review. The Office's rule [M.P.E.P. §2111.01] requires that "the words of a claim ... must be read as they would be interpreted by those of ordinary skill in the art".

LAW

117. Utility is a fact question, and proof of utility is sufficient if it is convincing to one of ordinary skill in the art or if it meets at least one stated objective.

"Utility is a fact question, see e.g., Wilden Pump v. Pressed & Welded Products Co, 655 F.2d 984, 988, 213 USPQ 282, 285 (9th Cir. 1981); Nickola v. Peterson, 580 F.2d 898, 911, 198 USPQ 385, 399 (6th Cir. 1978), cert. denied, 440 U.S. 961, 99 S.Ct. 1504, 59 L.Ed.2d 774 (1979)." ***

"When a properly claimed invention meets at least one stated objective, utility under 101 is clearly shown. See e.g., Standard Oil Co. (Indiana) v. Montedison, S.P.A., 664 F.2d 356, 375, 212 USPQ 327, 344 (3rd Cir. 1981), cert. denied, 456 U.S. 915, 102 S.Ct. 1769, 72 L.Ed.2d 174 (1982); E.I. du Pont de Nemours & Co. v. Berkley & Co., 620 F.2d 1247, 1258 n. 10, 1260 n. 17, 205 USPQ 1, 8 n. 10, 10 n. 17 (8th Cir.1980); Krantz and Croix v. Olin, 148 USPQ 659, 661-62 (CCPA 1966); Chisum on Patents, 4.04[4] [1983]."

[RAYTHEON COMPANY v. ROPER CORPORATION, U.S.C.A., Federal Circuit, 1983, 724 F.2d 951, 220 USPQ 592]]

"Proof of utility is sufficient if it is convincing to one of ordinary skill in the art. In re Irons, 52 CCPA 938, 340 F.2d 974, 144 USPQ 351 (1965). The amount of evidence required depends on the facts of each individual case. In re Gazave, 54 CCPA 1524, 379 F.2d 973, 154 USPQ 92 (1967). The character and amount of evidence needed may vary, depending on whether the alleged utility appears to accord with or to contravene established scientific principles and beliefs. In re Chilowsky, 43 CCPA 775, 229 F.2d 457, 108 USPQ 321 (1956)."

[In Re JOLLES, U.S.C.P.A., 1980. 628 F.2d 1322, 206 USPQ 885]

The Declarations demonstrate that the original specification and claims clearly define subject matter of considerable utility. Therefore, the Applicant has fully conformed with, and satisfied, the requirements of §101 of the Patent Act and met at least one (1) stated objective [Standard Oil Co. (Indiana) v. Montedison, S.P.A., 664 F.2d 356, 375, 212 USPQ 327, 344 (3rd Cir. 1981), cert. denied, 456 U.S. 915, 102 S.Ct. 1769, 72 L.Ed.2d 174 (1982); E.I. du Pont de Nemours & Co. v. Berkley & Co., 620 F.2d 1247, 1258 n.10, 1260 n.17, 205 USPQ 1,8n10,10n.17 (8th Cir. 1980); Krantz and Croix v. Olin, 148 USPQ 659, 661-62 (CCPA 1966); Chisum on Patents, 4.04[4] [1983]; RAYTHEON COMPANY v. ROPER CORPORATION, U.S.C.A., Federal Circuit, 1983, 724 F.2d 951, 220 USPQ 592].

The Examiner has rejected In re Zurko [142 F.3d 1447, 1449, 46 USPQ2d 1691, 1693 (Fed. Cir.), cert. granted, 119 S. Ct. 401 (1998)] which declares that utility is a fact question [RAYTHEON COMPANY v. ROPER CORPORATION, U.S.C.A., Federal Circuit, 1983, 724 F.2d 951, 220 USPQ 592], and one which the Examiner in this case must review for clear error [Cross v. Iizuka, 753 F.2d 1040, 1044 n.7, 224 USPQ 739, 742 n.7 (Fed. Cir. 1985); also In re Zurko].

118. The Examiner has rejected the directive of 1.131 (a)(1) which requires that "When ... a patent ... is rejected on reference ... to a printed publication, the inventor of the subject matter of the rejected claim ... may submit an appropriate oath or declaration to overcome the patent or publication." Unrebutted Declarations have been submitted in this case, and are again submitted, and the Examiner must respond to them substantively [Marino v. Hyatt Corporation; Morrill v. Tong; and Chelebda v. H.E. Fortuna & Brothers Inc.].

In re Irons indicates that utility is a fact question [RAYTHEON COMPANY v. ROPER CORPORATION]. The submitted Declarations and the publications (including e.g. McKubre) are relevant as proof of utility. They demonstrate utility and operability at the time of the filing of this patent, and that it was, and is, important and of considerable utility.

The Examiner has rejected In re Ziegler [992 F.2d 1197, 1200, 26 USPQ2d 1600, 1603 (Fed. Cir. 1993)] which requires the Examiner accept Declarations as factual proof of utility.

The Examiner has rejected Marino v. Hyatt Corporation, 793 F.2d 427, 430 (1st Cir. 1986); Morrill v. Tong, 390 Mass. 1207 129 (1983); Chelebda v. H.E. Fortuna & Brothers Inc. 609 F.2d 1022 (1st Cir. 1979); Lewis v. Bours, 119 Wn.2d 667, 670, 1992] which require the Examiner to assume that the Declarants' assertions are true.

The Examiner has rejected In re Ferens [417 F.2d 1072, 1074, 163 USPQ 609, 611 (CCPA 1969)] which heralds that Applicant's submitted evidence, including Declarations, is sufficient.

The Examiner has rejected Ex parte Porter which requires that Declarations, submitted in response to the Examiner's comments, must be read, examined, and carefully considered.

The Examiner has rejected In re Morris [127 F.3d 1048, 1053-56, 44 USPQ2d 1023, 1027-30 (Fed. Cir. 1997)] which demands that the interpretation of operability and utility is predicated upon that which one who is skilled-in-the-art would reach. The Examiner must give the claims their broadest reasonable interpretation consistent with that which those skilled-in-the-art would reach.

The Examiner has rejected *In re Oetiker* [977 F.2d at 1445, 24 USPQ2d at 1444] which requires the Examiner substantively and fully respond to the probative witnesses, because Applicant has undertaken the full burden coming forward.

The Examiner has rejected *Ex parte Gray* [10 USPQ2d 1922, 1928 (Bd. Pat. App. & Inter. 1989)] which allows for Applicant's submitted expert testimony regarding operability and utility, beyond the detailed specification. The Examiner must give substantial weight to said Declarations about what they said about this invention compared to the Examiner's art regarding the work of others.

The Examiner has rejected *In re Brana*, 51 F.3d at 1566, 34 USPQ2d at 1441] which indicates Applicant's actions hereby meet the "burden shift ... to provide rebuttal evidence sufficient to convince such a person of the invention's asserted utility".

The Examiner has rejected *In re Marzocchi* and *In re Oetiker* which require responsive argument to the fully addressed criticism against the Examiner's unfounded notions. *In re Marzocchi*, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971)] declares that the Examiner cannot make the rejection he has unless he has reason to doubt the objective truth of the statements contained in the written description, here corroborated and supported by multiple Declarations.

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 101

Transformation for Inactive to Active is Patentable even without the Other Features

119. Utility is a fact question, and proof of utility is sufficient if it meets at least one stated objective. Here it does - means to extract product using magnetic field inhomogeneity, based differential magnetic susceptibilities [cf. Swartz and Straus Declarations; A10-A21].

Furthermore, removal of product AND a two stage system involving application of two electric field intensities necessarily involve transformation of a state or thing. Therefore, the Examiner has not followed the standards of review because such a two state method should be patentable based upon opinion of the Court.

"Transformation and reduction of an article "to a different state or thing" is the clue to the patentability of a process claim that does not include particular machines."

[Gottschalk v. Benson, 409 U.S. 63 (1972),
409 U.S. 63, No. 71-485]

"Industrial processes such as this ["a physical and chemical process (which involves) the transformation of an article into a different state or thing"] are the types which have historically been eligible to receive the protection of our patent laws. [450 U.S. 175, 185]"

[Diamond v. Diehr, 450 U.S. 175 (1981)]

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 101

The Examiner Ignores Constitutional and Congressional Directive

120. The Examiner has rejected the controlling authority of Art. I, §8, cl. 8 which provides that "Congress shall have Power (t)o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries". Art. I, §8, cl. 8 empowers Congress in this matter.

The Examiner has rejected that the US Congress has mandated progress.

"The patent laws (reflect) this Nation's deep-seated need to encourage progress."

[Diamond v. Chakrabarty, 447 U.S. 303 (1980),
447 U.S. 303, No. 79-136]

The Examiner has rejected that the US Congress has mandated encouragement of science, and the Office's actions are inconsistent with the Patent Act of 1793, authored by Thomas Jefferson, which defined statutory subject matter as "any new and useful art, machine, manufacture, or composition of matter" Act of Feb. 21, 1793, 1, 1 Stat. 319, and with the Act which embodied Jefferson's philosophy that "ingenuity should receive a liberal encouragement." [447 U.S. 303, 309].

ADDITIONAL REASON OVERCOMING THE EXAMINER'S POSITION REGARDING USC 101

The Examiner Mistakes a Question of Fact for a Question of Law?

121. The Examiner dismisses the invention as opinion. However, Declarants' statements and the peer-reviewed publications are Fact. Exactly how many Declarants does it take to overcome the Examiner's unsubstantiated rejection?

The Examiner has mistaken a question of fact for a question of law. The Examiner cannot dismiss Declarations improperly to "opinion"-status without an adequate explanation of how the Declarations failed to overcome the *prima facie* case initially established by the Examiner.

The Examiner has rejected *In re Alton* which requires that even the use of the words "it is my opinion" to preface what someone of ordinary skill in the art knows does not transform the factual statements contained in the declaration into opinion testimony.

122. Utility is a fact question, and proof of utility is sufficient if it is convincing to one of ordinary skill in the art or if it meets at least one stated objective. In this case, the invention is convincing to several of ordinary skill in the art and have stated so at public meetings and the invention meets several stated objectives.

The invention (structure, operation and composition) is defined by the claims and the original specification, and in this case they correctly define the invention, and if the teachings have been corroborated, and therefore there is enablement (a question of law; *In re Fouche*, 439 F.2d 1237, 1243, 169 USPQ 429, 434, (CCPA 1971)). Enablement, utility, and operability are grounds for patentability.

In this case, the Applicant has set forth products and methods which have undergone peer-review, and as such do present utility within the meaning of 35 U.S.C. 101 [*Brenner v. Manson*, 148 U.S.P.Q. 689].

In this case, given the above, and the following, utility under 101 is clearly shown. Given the utility Applicant respectfully requests reconsideration of the rejection of Claims 1, 5 through 8, 10 through 14, and 21 through 30 pursuant to U.S.C. 101.

CONCLUSION

123. Applicant taught in the original specification and claims how his apparatus works and claimed the invention.

Applicant has made a diligent effort to amend the claims of this application so that Claims 1, 5 through 8, 10 through 14, and 21 through 30 define a novel structure which is also submitted to render said claimed structure unobvious because it produces new and unexpected results.

The Applicant has explained in detail (*supra*) how Westfall and Kinsella and the other cited art are different and therefore produce a different result from the present invention. Applicant has given lists of additional critical features and components which distinguish Applicant's invention to operatively function in a different manner to the cited art. Therefore, the Applicant submits that any combination of Westfall or Kinsella, with the art is an improper one, absent any showing in the references themselves that they can or should be so combined. Neither of the references appears to suggest, or allude to, or teach a structure as defined by Claims 1, 5 through 8, 10 through 14, and 21 through 30. It appears that the figures and claims of Westfall and Kinsella and the other cited art are intended to, and do, serve a different purpose than does the structure defined by the claims, and each of the cited art adds nothing of substance.

None of the references shows a method which includes in combination supplying an isotopic fuel to said material, loading said isotopic fuel into said material by an applied electric field, and then at a later point in time applying a second applied electric field to redistribute said isotopic fuel within said material, means to control the distribution of the loaded isotopic fuel within the material, means including barriers impermeable to the flow of said isotopic fuel within said material, or two orthogonal applied electric fields with the second applied electric field intensity is delivered after full charging has been achieved, or a deuteron impermeable barrier is comb-shaped, or a cathode divided into parallel slabs and alternate deuteron-impermeable barriers. None of the references shows these features.

Based upon the facts cited here, these Claims 1, 5 through 8, 10 through 14, and 21 through 30 are patentable over the cited references because the claims recite novel structure and thus are distinguished physically over every reference [Sec. 102], and the physical distinctions effect new and unexpected results, thereby indicating that the physical distinction is simply not obvious [Sec. 103].

124. As the original specification and claims teach, the invention solves the long-standing problem of controlling hydrogen flow in metals and product formation - features of great utility. The Examiner should admit that said features are not "incredible" but can be elicited when using the teachings of the original specification and claims. Furthermore, there is documented existence of these reactions and the preferred environment in which the present invention does operate. The number of papers in this field confirms both the "existence" and "utility" of these phenomena and any associated technologies.

125. If the Examiner disagrees, the Applicant requests specificity as to the reason to facilitate Appeal. Specifically, Applicant requests that Examiner makes clear in the record which of these submitted averments by the Declarants regarding operability and utility were formally considered, and if the Examiner disputes them, exactly how he will have reached his conclusion. If the Examiner dismisses, ignores, or relegates improperly to "opinion"-status, any or all of the submitted Declarations, the Applicant hereby explicitly requests an adequate explanation of how the Declarations failed to overcome the *prima facie* case initially established by the Examiner. If the Examiner has anything which differs or rebuts anything in the original specification and claims -- or the Declarations and Exhibits, Applicant requests it is stated explicitly pointing to where in Applicant's publications or applications said rebuttal relates with specificity.

Request For Constructive Assistance

126. If, for any reason the claims of this application are not believed to be in full condition for allowance, the applicant respectfully requests the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims [pursuant to MPEP 707.07(j)] or in making constructive suggestions [pursuant to MPEP 706.03(d)] in order that this application can be placed in allowable condition as soon as possible and without the need for further proceedings.

Applicant notes that the U.S. Supreme Court has ruled that any *pro se* litigant is entitled to less stringent standards [U.S. Rep volume 404, pages 520-521 (72)].

WHEREFORE for the above reasons, including Declarations and the peer-reviewed published papers, the Applicant respectfully requests reconsideration and reversal of the Examiner's rejections of Claims 1-14 which have been rejected under 35 U.S.C. 102 (b) as being anticipated by Westfall (US 5,215,631),

Claims 1, 2, 10 and 11 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Kinsella (U.S. 3,682, 806),


Claims 1-7, 10-12, and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Cedzynska et al. (WO 93/01601) or Edwards (WO 90/15416) in view of Westfall,

Claims 8, 9 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Cedzynska et al. in view of Westfall, as applied to claims 1 -7, 10-12, and 14 above, and further in view of anyone of Edwards, Sadoway (WO 91/06959) or Van Noorden (NL 8909-962-A) or Dufour (WO 91/01036),

Claims 1-14 are rejected under 35 U.S.C. 112 and 35 U.S.C. 101 by the Examiner, based upon flawed reference to other art ("FP" or "F+P"),

as is just and reasonable or address each matters of law and errors of fact cited herein, or in the alternative allow Claims 1, 5 through 8, 10 through 14, and 21 through 30.

Respectfully,


 Mitchell R. Swartz, ScD, MD, EE
 16 Pembroke Rd., Weston, MA 02493

Certificate Of Mailing [37 CFR 1.8(a)]

December 4, 2002


To Whom it Does Concern:

I hereby certify that this correspondence will be deposited with the United States Postal Service by First Class Mail, postage prepaid, in an envelope addressed to

"The Commissioner of Patents and Trademarks
 Washington, D.C. 20231" on the date below.
 Thank you.

Sincerely,

December 4, 2002


 M.R. Swartz
 16 Pembroke Rd. Weston, MA 02493

VERSION WITH MARKINGS TO SHOW CHANGES MADE**In The Specification**

U.S. PATENT DOCUMENTS, on page 2, have been amended as follows:

07/339,976 04/18/1989 Swartz, M. R., "Systems to Increase the Efficiency, Control, Safety and Energy Utilization of Electrochemically Induced Fusion Reactions".

07/371,937 06/27/1989 Swartz, M. R., "Systems to Monitor and Accelerate Electrochemically Induced Fusion Reactions".

08/406,457 03/20/1995 Swartz, M.R., "Apparatus To Determine The Activity Of A Sample Loaded With Isotopic Fuel"

09/573,381 05/19/2000 Swartz, M.R. "Method And Apparatus To Integrate Reactors Involving Reactions Within A Material"

Paragraph page 2, lines 15-21, has been amended as follows:

The present invention relates to electrochemical reactions in or about metals, such as palladium which has been electrochemically loaded with deuterium, but it has relevance as well, to hydrogen storage, ~~fuel cells~~, nuclear fusion, and other reactions in ~~pressure~~-loaded metals such as titanium or palladium filled with deuterium, and to the broader field of metallurgy and engineering in or about metals, including Groups IVb, Vb, and some rare earths.

[Corrected] The present invention relates to electrochemical reactions in or about metals, such as palladium which has been electrochemically loaded with deuterium, but it has relevance as well, to hydrogen loading, nuclear fusion, and other reactions in loaded metals such as titanium or palladium filled with deuterium, and to the broader field of metallurgy and engineering in or about metals, including Groups IVb, Vb, and some rare earths.

OTHER PUBLICATIONS listed on page 2, has been amended as follows:

[Amended] C. A. HAMPEL, Rare Metals Handbook, Reinhold Publishing Corp, (1954).

M. HANSEN, Constitution of Binary Alloys, McGraw-Hill Book Co., Inc (1958).

J. R. Melcher, "Continuum Electromechanics", MIT Press, Cambridge, (1981).

J. OM BOCKRIS, K.N. REDDY, "Modern Electrochemistry", Plenum Press (1970).

C. A. HAMPEL, Rare Metals Handbook, Reinhold Publishing Corp, (1954).

M. HANSEN, Constitution of Binary Alloys, McGraw-Hill Book Co., Inc. (1958).

C. J. SMITHELLS, Metals Reference Book, Butterworths Scientific, (1949).

H. H. UHLIG, Corrosion and Corrosion Control, John Wiley & Sons, Inc., (1971).

M. SWARTZ, "Quasi-One-Dimensional Model Of Electrochemical Loading Of Isotopic Fuel Into A Metal", Fusion Technology, 22, 2, 296-300 (1992).

M. SWARTZ, (1994A) "Isotopic Fuel Loading Coupled To Reactions At An Electrode", Fusion Technology, 26, 4T, 74-77.

M. SWARTZ, (1994B) "Catastrophic Active Medium Hypothesis of Cold Fusion", Vol. 4. "Proceedings: "Fourth International Conference on Cold Fusion", EPRI and Office of Naval Research.

M. SWARTZ, "A Method To Improve Algorithms Used To Detect Steady State Excess Enthalpy", Transactions of Fusion Technology, 26, 156-159 (1996).

M. SWARTZ, "Consistency of the Biphasic Nature of Excess Enthalpy in Solid State Anomalous Phenomena with the Quasi-1-Dimensional Model of Isotope Loading into a Material", Fusion Technology, 31, 63-74 (1997A).

M. SWARTZ, "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", Journal of New Energy, 1, 4, 26-33 (1997B).

M. SWARTZ, "Codeposition Of Palladium And Deuterium", Fusion Technology, 32, 126-130, (1997C).

M. SWARTZ, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, Transactions of the American Nuclear Association, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85 (1998A).

M. SWARTZ, "Patterns of Failure in Cold Fusion Experiments, Proceedings of the 33RD Intersociety Engineering Conference on Energy Conversion, IECEC-98-I229, Colorado Springs, CO, (1998B).

A. VON HIPPEL, "Dielectric Materials and Applications", MIT Press, (1954)

A. VON HIPPEL, D.B. Knoll, W.B. Westphal, "Transfer Of Protons Through 'Pure' Ice I_h Single Crystals", J. Chem. Phys., 54, 134, (ALSO 145), (1971). --

Paragraph 3 on Page 4 [addition to line 9] has been amended as follows:

[Amended] FIGURE 2 is a crosssectional drawing of a lamellar ~~CAM~~-reactor. This device has two orthogonal applied electric fields. The second applied electric field intensity is delivered after full charging. Between these slabs of the cathode alternate deuteron-impermeable barriers.

Paragraph 2 on page 5 [changes to lines 5-9] have been amended as follows:

[Amended] The power supply and control unit consists of a current source and reactor-control device as described in Swartz (07/339,976; 08/406,457; or available as the FUSOR power supply, JET Energy Technology, P.O. Box 81135, Wellesley Hills, MA), and are not shown in the figure. The application of said power source creates an applied electric field intensity which produces cation flow towards the cathode as described in 07/339,976, 08/406,457, Swartz, M., 1997A, "Consistency of the Biphasic Nature of Excess Enthalpy in Solid State Anomalous Phenomena with the Quasi-1-Dimensional Model of Isotope Loading into a Material", *Fusion Technology*, 31, 63-74, and Swartz, M., 1998A, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, Transactions of the American Nuclear Association, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85]. The codeposition is described in "Codeposition Of Palladium And Deuterium", *Fusion Technology*, 32, 126-130 (1997). There results in the near cathode solution (labelled as 5 in figure 1) a buildup of deuterons, and a low dielectric constant (gas bubble) layer. The bubbles are labelled as number 10 in figure 1. There may be spikes or on the cathode (labelled as 11 in figure 1).

Paragraph 3 (last) on Page 5 [addition to line 14] has been amended as follows:

[Amended] Figure 2 is a cross-sectional drawing of a lamellar CAM reactor [Swartz, M., 1994B, "Catastrophic Active Medium Hypothesis of Cold Fusion", Vol. 4, "Proceedings: "Fourth International Conference on Cold Fusion", EPRI and Office of Naval Research; Swartz, M., 1997B, "Hydrogen Redistribution By Catastrophic Desorption In Select Transition Metals", Journal of New Energy, 1, 4, 26-33]. This device has two orthogonal applied electric fields. The first (labelled E-field number 1 in the the figure) is that which is applied to charge the palladium with deuterons. The second applied electric field intensity is delivered after full charging has been achieved. In the figure the anode and cathode are labelled as 7 and 1. The electrolyte solution or gel is labelled as 6. The connections for the first electric field are labelled as 81 and 82. The connections for the second electric field are labelled as 85 and 86. The mechanical casing is labelled 20. The deuteron impermeable barrier is comb-shaped in this preferred configuration, and is labelled 55 in figure 13.

Paragraph 1 on Page 6 has been amended as follows:

[Amended] The cathode in this preferred configuration is divided into parallel slabs. Between these slabs alternate deuteron-impermeable barriers. Application of the second electric field causes the deuterons already loaded in the cathode to redistribute, but the deuteron-impermeable barrier(s) act to enhance the desired reactions as described in Swartz, M., 1998A, Improved Electrolytic Reactor Performance Using π -Notch System Operation and Gold Anodes, Transactions of the American Nuclear Association, Nashville, Tenn 1998 Meeting, (ISSN:0003-018X publisher LaGrange, Ill) 78, 84-85].

Page 6, lines 15-24, 3rd paragraph, has been amended as follows:

[Amended] These CAM devices are inserted, similar to a fuse onto a holding board, held in place by clips (~~labelled 101~~) as described in 09/573,381. The three CAM device are connected to a microprocessor control system (~~labelled 110~~) as described in 07/339,976 and 08/406,457. Said apparatus has an electrical bus to connect the anodes which are connected to the anodic connectors (labelled 82). Said apparatus has an electrical bus to connect the cathodes (labelled 106 and 107) which are connected to the cathodic connectors (not labelled in the figure, but of a specialized socket described in 09/573,381). The cathodic system buses (106 and 107) are electrically shorted together during the deuterium charging.

In The Claims

Claim 1 has been amended as follows:

1.(Amended) In a process for producing a product using a material loaded with an isotopic fuel, a method to control the production of said product which includes in combination:

applying an electric field to load ~~supplying~~ said isotopic fuel to said material,
loading said isotopic fuel into said material, ~~and~~
~~applying in combination two~~ a second electric field in a non-parallel direction to the
first applied electric fields,
producing redistribution of said isotopic fuel within said loaded metal,
thereby controlling the product produced.)

1.(Corrected)

In a process for producing a product using a material loaded with an isotopic fuel, a method to control the production of said product which includes in combination:

applying an electric field to load said isotopic fuel to said material,
loading said isotopic fuel into said material,
applying a second electric field in a non-parallel direction to the first applied electric fields,
producing redistribution of said isotopic fuel within said loaded metal,
thereby controlling the product produced.

Claims 2 through 4 have been canceled without prejudice.

Claim 8 has been amended as follows:

8. (Amended) In a method as in claim 1, where the additional step is taken of applying a spatially inhomogeneous magnetic field intensity through said material.

Claim 9 has been canceled without prejudice.

Claim 10 has been amended as follows:

10. (Amended) In a process for producing a product using a material by a reaction, a method to control the redistribution of isotopic fuel loaded into said material ~~production of said product~~ which includes in combination:
 supplying an isotopic fuel to said material,
 loading said isotopic fuel into said material by an applied electric field, and
 applying ~~a~~ the second applied electric field
electric field to said material loaded with said isotopic fuel,
thereby effecting to redistributeion of said isotopic fuel.

10. (Corrected) In a process for producing a product using a material by a reaction, a method to control the redistribution of isotopic fuel loaded into said material which includes in combination:
 applying an electric field to load said isotopic fuel into said material,
 applying a second electric field to said material loaded with said isotopic fuel,
 thereby effecting redistribution of said isotopic fuel.

Claim 13 has been amended as follows:

13. (Amended) In a method as in claim 10, where the additional step is taken of applying a spatially inhomogeneous magnetic field intensity through said material.

Claims 21 through 30 have been added as follows:

21. In a process for producing a product using a metal loaded with an isotope of hydrogen, a method to effect redistribution of said isotope of hydrogen in said material which includes in combination:
 applying an electric field to load said isotope of hydrogen into said metal,
 loading said metal with said isotope of hydrogen,
 thereafter applying a second electric field in a non-parallel direction to the first applied electric field,
 thereby distributing said isotope of hydrogen within said loaded metal.

22. In a method as in claim 21, where the material is a member of the group consisting of palladium, titanium, or nickel or their alloys.
23. In a method as in claim 21, where the additional step is taken of applying a spatially inhomogeneous magnetic field intensity through said material.
24. In a method as in claim 21, where the additional step is taken of having said redistribution of said isotopic fuel impact a barrier impermeable to said isotopic fuel.
25. In a method as in claim 24 where there are more than one impermeable barrier arranged in alternating layers with said loaded material.
26. In a method as in claim 1, where the additional step is taken of having said redistribution of said isotopic fuel impact a barrier impermeable to said isotopic fuel.
27. In a method as in claim 26, where there are more than one impermeable barrier arranged in alternating layers with said loaded material.
28. In a method as in claim 10, where the additional step is taken of having said redistribution of said isotopic fuel impact a barrier impermeable to said isotopic fuel.
29. In a method as in claim 28, where there are more than one impermeable barrier arranged in alternating layers with said loaded material.
30. In a method as in claim 1, where said material is axially-loaded with said isotopic fuel.